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Our ref: NMS-NRC-06-001
Your Ref:

Mr. Cuadrado:

January 6, 2006

Subject: CERTIFICATE OF COMPLIANCE NO. 9292 FOR THE MODEL NO. PATRIOT PACKAGE: SUBMISSION of Response to Request for Additional Information (RAI) – DOCKET No. 71-9292; TAC No. L23900

Attached please find our response to the Request for Additional Information (RAI) dated December 27, 2005.

Westinghouse appreciates the NRC's offer of giving prompt attention to this response in order that an amended certificate can be issued by mid-January.

Please direct any questions to the me at (803) 647-3552.

Sincerely,
WESTINGHOUSE ELECTRIC COMPANY, LLC

Norman A. Kent
Manager Transport Licensing and Regulatory Compliance
Nuclear Material Supply

Enclosures:

1. RAI Questions and Westinghouse Responses
2. Revised Comparison of Section 6 from the Patriot and CE-B1 SARs
3. Proposed Wording of the Patriot Certificate of Compliance
4. Proposed change pages to the License Application

Enclosure 1: RAI Questions and Westinghouse Responses

Chapter 1.0 - General Information

1-1 Provide revised package drawings that show all package configurations or modifications made during refurbishment activities. Show that these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71, particularly the requirements of 10 CFR 71.19(d)(2).

Recent QA inspection results show that during recent refurbishment activities, the licensee performed modifications to the package configuration that are not reflected in the package drawings. These package modifications included cutting and re-welding of the inner container lid ends. The applicant must ensure that the actual package configuration meets the description of the configuration provided in the drawings referenced in the Certificate of Compliance (CoC).

Additionally, the applicant should consider including a description of repair or maintenance activities performed in Chapter 8 of the application.

This information is needed to satisfy the requirements of 10 CFR 71.I9 and 71.33.

Westinghouse Response:

During the recent refurbishment program, it was noticed that the inner container configurations for the Patriot BWR fuel shipping package[1] were not captured precisely on the license drawings. To show that these configurations do not affect the ability of the package to meet the requirements of 10CFR71, it is necessary to demonstrate that they have already existed on NRC licensed RA-3 type shipping packages. The following paragraphs specify where the configurations are found in NRC licensed BWR packages.

The different configurations, which were described and discussed in detail during a meeting held with NRC on December 7, 2005, include the following:

- Perforated lid liner – method of attaching to lid
- Inner container lid end cap configuration
- Inner base basket – method of fastening
- Bolting lug configuration
- Pressure vacuum relief valve location

Each configuration is discussed below, along with illustrations and sketches. These will be included as needed in the revision to Section 8 of the SAR.

[1] The Patriot inner containers include those formerly belonging to the CE-B1 package.

Perforated lid liner – method of attaching to lid

The perforated lid liner was found to be attached to the lid by two different methods, overlapping and non-overlapping. Figure 1 and Figure 2 show examples of the lid liner and inner container lid welded together with no overlap. (This method may have the two components folded and welded together or simply matched and welded. See the left sketch in Figure 7) Note that Figure 2 shows a detail from the Patriot license drawing 10014E28.

Figure 1: Refurbished (right) and unrefurbished inner containers showing welded components

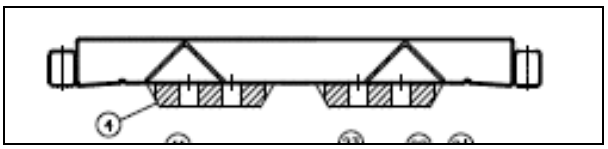

Figure 2: Section F-F from License Drawing 10014E28

The second method, which was noticed during refurbishment, shows the lid liner overlapping the lid and being welded to it. Figure 3 shows two photographs of this configuration. Though not identified on the Patriot License Drawing, this is an acceptable configuration for an RA-3 type shipping package as it is shown on an earlier NRC-approved RA-3 License Drawing, as seen in Figure 4. Hence, this configuration does not affect the ability of the package to meet the requirements of 10CFR71. Section 8 of the SAR will be revised to include a sketch showing the overlapping method of attaching the lid liner to the lid.

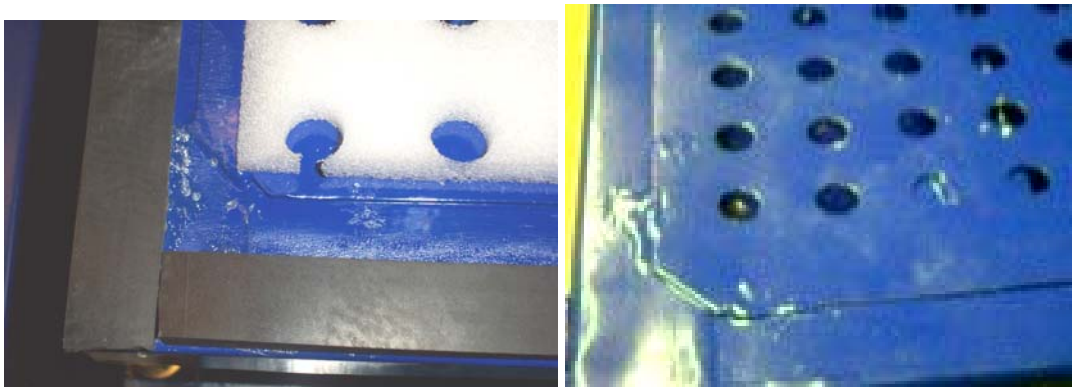

Figure 3: Refurbished inner container showing overlapping lid liner

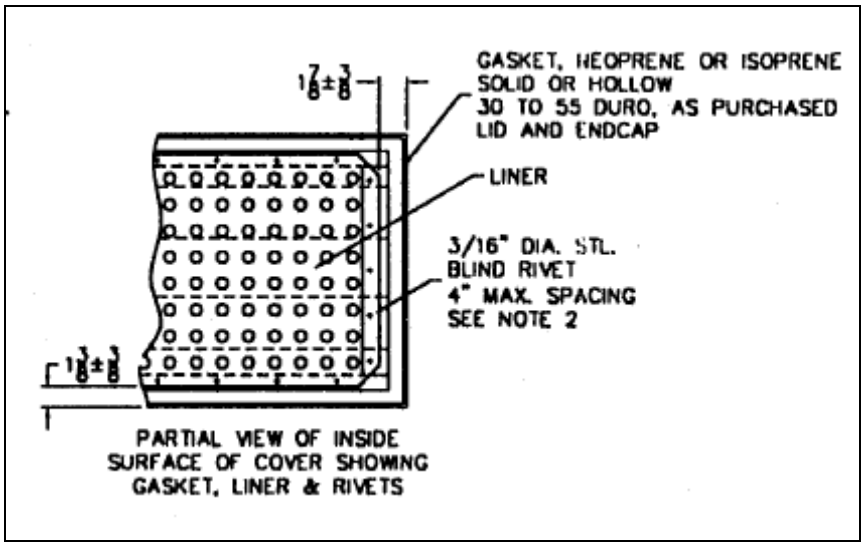

Figure 4: Detail from RA-3 License Drawing 769E231 showing overlapping lid liner

Inner container lid end cap configuration

The recent NRC QA inspection team noted that the refurbishment activities included cutting and re-welding the inner container lid ends to the lids in a manner that was not reflected in the license drawings. The Patriot license drawings show an end cap design as depicted on the left in Figure 5. The detail from the Patriot license drawing is shown in Figure 6. This particular design has a full-length bottom tab and partial-length upper tab.

Two other lid end cap configurations are also shown in Figure 5. One is a flat plate and the other has partial-length top and bottom tabs. Though not identified on the Patriot License Drawing, they are acceptable configurations for RA-3 type shipping packages as both are shown on earlier NRC-approved RA-3 license drawings. Excerpted details of these are shown in Figure 7.

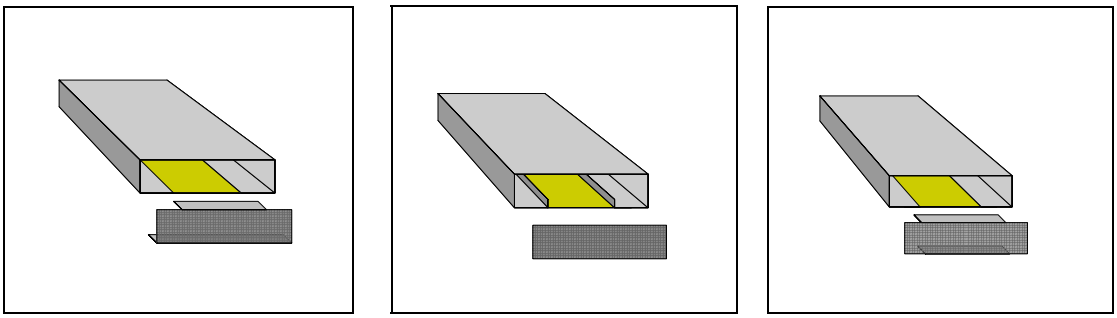

Figure 5: Sketches of three end cap configurations (not to scale)

Hence, these configuration do not affect the ability of the package to meet the requirements of 10CFR71. Section 8 of the SAR will be revised to include a sketch showing these additional lid end cap configurations. The sketch is given in Figure 8.

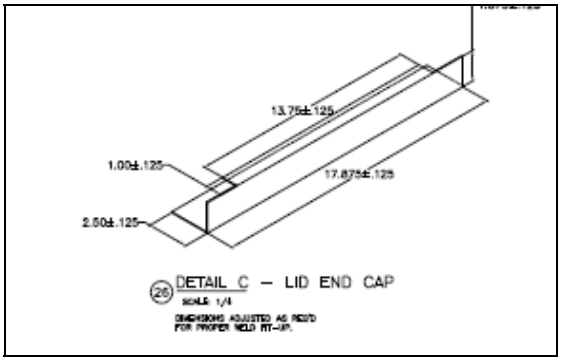

Figure 6: Detail of end cap from Patriot license drawing 10014E28

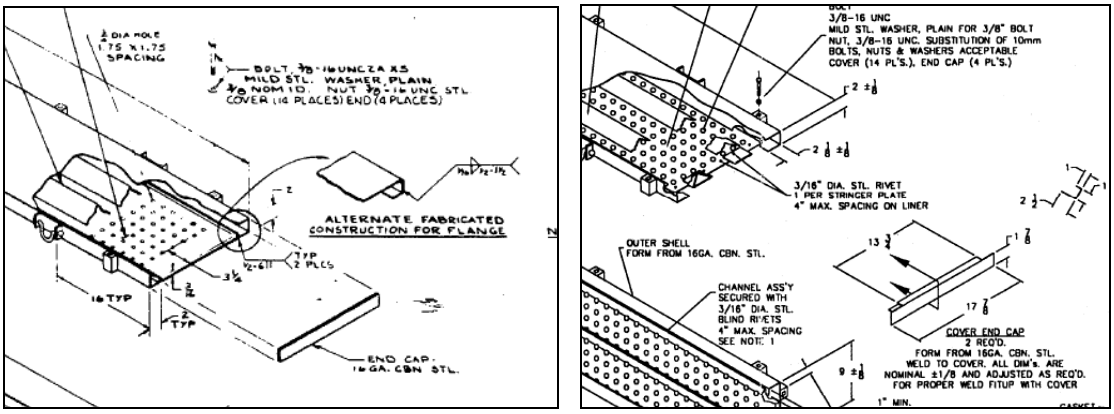

Figure 7: Details from RA-3 license drawings 769E231 and 769E232 showing optional lid end cap configurations

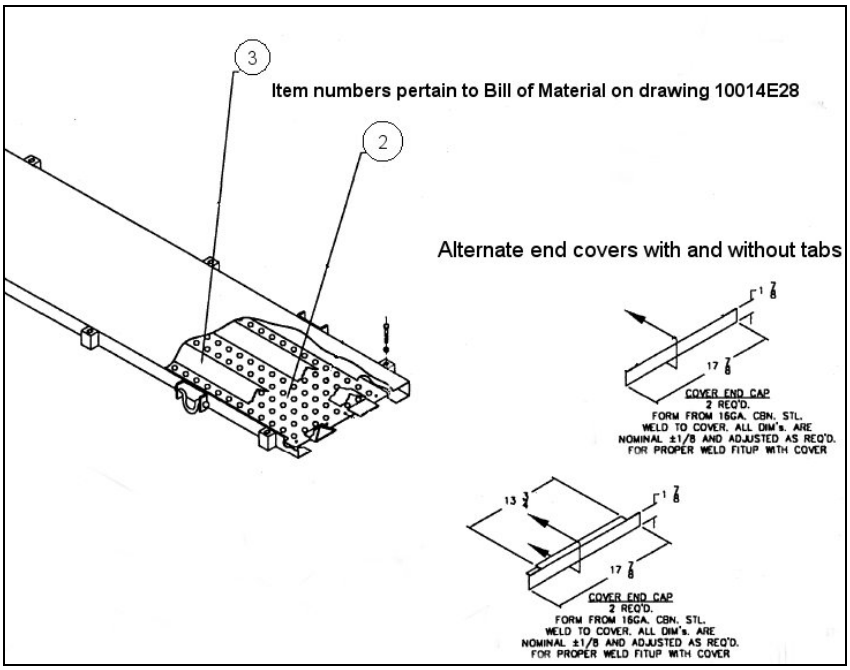

Figure 8: Sketch showing the optional lid end cap configurations

Inner base basket – method of fastening

The Patriot license drawing provides very little information on the method for fastening the inner base basket. As can be seen in Figure 9, the drawing provides typical weld description.

During the refurbishment it was found that some baskets (or channels) were fastened together with rivets or clamps. Note that Figure 10, a detail from an earlier NRC-approved RA-3 License Drawing, makes allowance for the channels to be otherwise fastened together. Hence, this configuration does not affect the ability of the package to meet the requirements of 10CFR71. Section 8 of the SAR will include a paragraph or a sketch that allows channels to be riveted or clamped together.

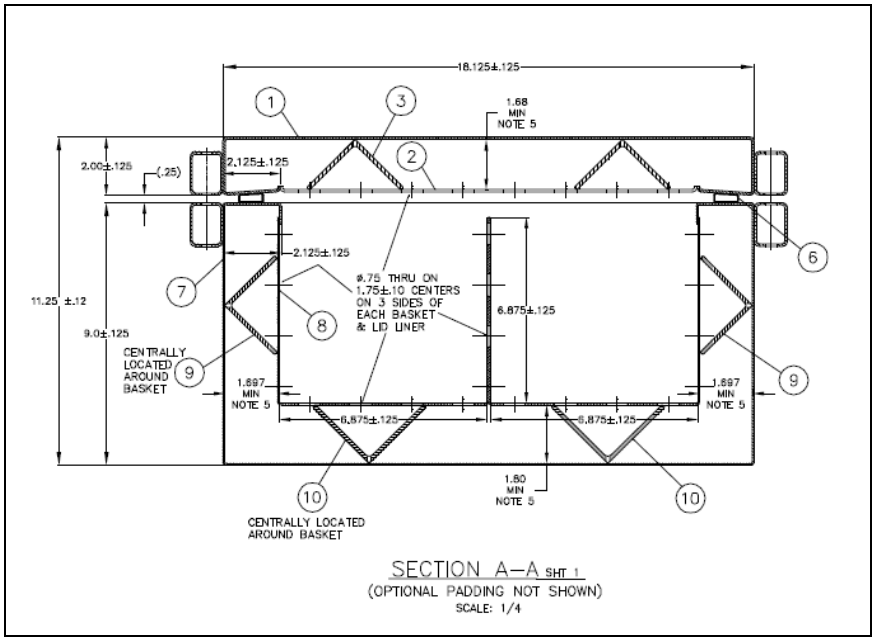

Figure 9: Detail of inner base basket from Patriot license drawing 10014E28

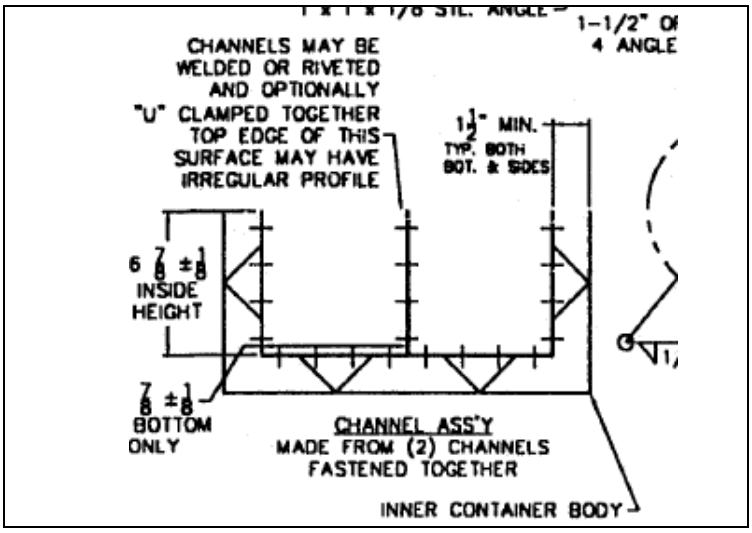

Figure 10: Detail allowing optional basket fastening methods from RA-3 drawing 769E231

Bolting lug configuration

It was found that there were three bolting lug configurations on the Patriot inner container. They are shown in Figure 11. All are bounded by the license drawing Detail A, as shown in Figure 12.

Figure 11: Bolting lug configurations

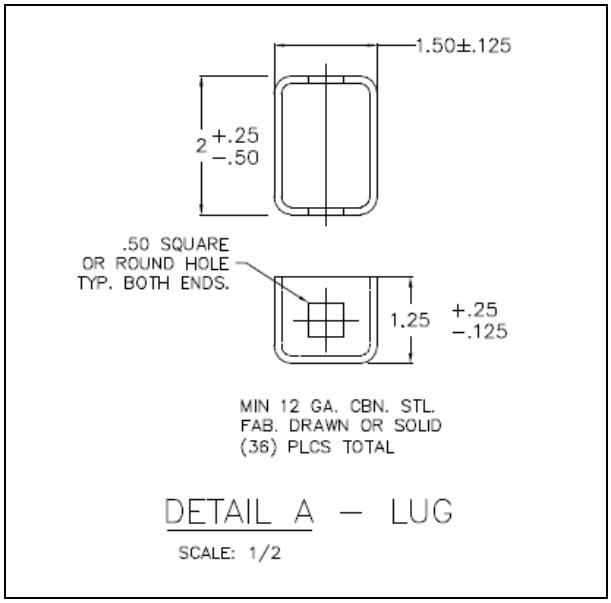

Figure 12: Detail A from Patriot license drawing 10014E28

Pressure vacuum relief valve location

Finally, it was recognized during the refurbishment effort that the pressure vacuum relief valves were located in various spots. Figure 13 shows three locations. Again, the Patriot license drawing adequately bounds the found configurations, as can be seen in Figure 14.

Figure 13: Pressure vacuum relief valve locations

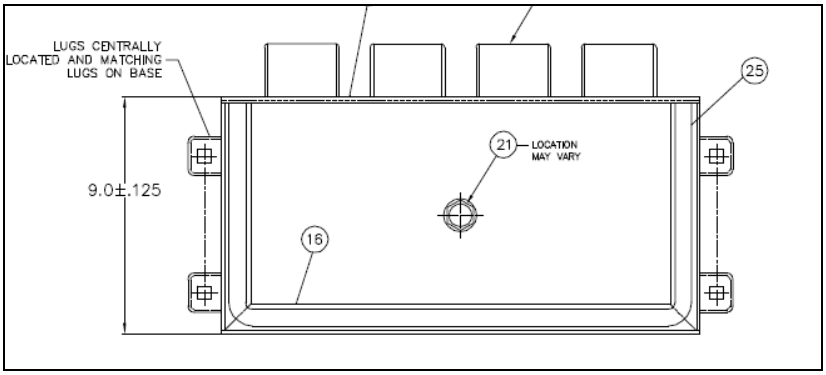

Figure 14: Inner end cove assembly detail from Patriot license drawing 10014E28

1-2 Revise Enclosure 2 of the application dated September 22, 2005. Specifically, the dimension stated for the length of the PATRIOT inner container is inconsistent with the dimension specified in Condition 5.(a)(2), "Description," of CoC No. 9292, Rev. 3.

This information is needed to satisfy the requirements of 10 CFR 71.7(a).

Westinghouse Response:

A comparison of dimensions between the license application (SAR) and Certificate of Compliance revealed inconsistencies in three places. The information is captured in the table below. Notice first that the CoC dimension differs from the SAR and license drawing for the Patriot outer container outside length and height. We propose that the CoC Revision 4 values be changed to reflect the values in the SAR.

Note also that the inner container outside length dimensions differ. The different values simply represent the inclusion or exclusion of the angle iron bracing on the outside of the inner container. Enclosure 2 has been revised to make dimensions consistent with the license drawings.

	Length (inches)	**Width (inches)**	**Height (inches)**
OUTER CONTAINER			
Outside Dimensions			
Patriot (approximate)			
CoC Rev 3	**207.50**	30.25	**31.75**
SAR 2.1.3	**207.75**	30.25	**31.25**
SAR 10014E27	**207.75**	30.25	**31.25**
CE-B1 (approximate)	208.50	33.50	34.75
Inside Dimensions			
Patriot (approximate) CoC	187.00	25.75	24.00
CE-B1 (approximate) CoC	187.00	28.50	26.125
INNER CONTAINER			
Outside Dimensions			
Patriot (approximate)			
CoC	**179.75**	18.125	11.25
2.1.1 (includes angle iron braces)	**182.00**	18.125	11.25
2.1.4 (excludes angle iron braces)	**179.75**	18.125	11.25
SAR 10014E28 SHT 1 & 2	**179.75/182.4**	18.125	11.25
CE-B1 (approximate)			
CoC	182.00	18.125	11.25
2.1.1	182.00	18.125	11.25
L-9272	179.45/182.10	18.125	11.25

1-3 Provide wording for a proposed condition in the CoC limiting use of the CE-B1 inner container to those containers identified in Condition 9 of CoC No. 9272, Rev. 6. and restricting fabrication of new packages to those described in Drawing No. 10014E27, Rev. 1 and 10014E28, Sheets 1 and 2, Rev. 1, as referenced in CoC No. 9292, Rev. 3 for the PATRIOT package.

The conditions for approval of CoC No. 9272 specify that a specific number of CE-BI packages are authorized for use, identified by serial numbers CE-B1/001 through CE-B1/039, inclusive. This condition restricts fabrication of new CE-BI packages. Additionally, the proposed engineering drawings for the new CE-B1 inner container do not include codes and standards for new fabrication.

This information is needed to satisfy the requirements of 10 CFR 71 -31 (c).

Westinghouse Response:

Enclosure 3 contains the proposed wording for the revised Certificate of Compliance.

Enclosure 2: Comparison of Section 6 from the Patriot and CE-B1 SARs

This enclosure contains a section-by-section comparison of section 6 of the two SARs. It can be seen that the inner container criticality analysis is used in both.

6.0 CRITICALITY SAFETY EVALUATION

- Sections are identical.
  - 52 packages
  - 104 fuel bundles
  - 10x10 fuel assemblies: TI=1.0

6.1 Discussion and Results

- Sections are identical with the exception of dimensions. See below.

- The criticality safety evaluations of both address use of the packages package for the same three fuel package loadings employing a 10 x 10 fuel rod assembly design.

- The safety demonstration is based on the use of lower tolerance values of the exterior dimensions of the inner shipping container as well as for the thicknesses of the bottom, top, and side annulus regions created by the angle iron brackets.

- Dimensional data on the Patriot and CE-B1 are given below:

	Length (inches)	Width (inches)	Height (inches)
Outer Container			
Outside Dimensions			
Patriot (approximate)	207.75	30.25	31.25
CE-B1 (approximate)	208.50	33.50	34.75
Inside Dimensions			
Patriot (approximate)	187.00	25.75	24.00
CE-B1 (approximate)	187.00	28.50	26.125
Inner Container			
Outside Dimensions			
Patriot (approximate)	182.00	18.125	11.25
CE-B1 (approximate)	182.00	18.125	11.25

- Criticality analyses are virtually identical for both normal and hypothetical accident transportation conditions.
  - For normal transportation conditions, reactivity assessments are based on an infinite array of intact shipping packages consisting of both the inner and outer containers. The fuel assemblies are nearly centered within the baskets of each inner package using ethafoam spacer blocks and rubber spacer pads; the inner container is, in turn, positioned within the outer package by ethafoam and honeycomb spacer blocks.

  - For the accident conditions, the outer package and the inner container gasketing material are both assumed to be absent. An array of 104 inner packages is assumed to be configured in a fully reflected, contiguous cubical array (8 x 13 x 1). The accident analyses assume both baskets of each inner package contain a fuel rod assembly; packaging configurations include both normal packaging conditions as well as a postulated loss of the ethafoam and rubber packaging materials. The accident analyses consider the presence of the poly inserts between fuel rods as in the normal packaging conditions.

  - The analysis in both SARs included examination of the worth of the plastic inserts during events involving a postulated loss of rubber and ethafoam packaging materials and concluded the system was more reactive when the plastic inserts were present. Consequently, this latter condition was assumed for all accident analyses presented herein.

  - The analyses of both also examined the effects of enrichment zoning and Urania pellet diameters versus Gadolinia-Urania fuel rod patterns; again these analyses showed no significant effects. Since the fuel assembly component dimensions are unchanged from the prior analyses, these effects were not re-examined in these analyses.

- Summaries of conclusions of both analyses are identical:

- Conclusions are identical:

6.2 Package Fuel Loadings

6.2.1 General

- Unchanneled fuel
- PARAGRAPH NOT IN CE-B1 SAR - Each fuel bundle will be unsheathed or enclosed in an unsealed, polyethylene sheath which will not extend beyond the ends of the fuel assembly. The ends of the sheath, if present, will not be folded or taped in any manner

that would prevent the flow of liquids into, or out of, the sheathed fuel assembly. The presence of an open-ended sheath, which ensures uniform draining during hypothetical accident conditions, is bounded by the range of moisture conditions analyzed.

- LAST SENTENCE OF PARAGRAPH NOT IN CE-B1 SAR - The total quantity of the polyethylene shims will not exceed 18.33 g polyethylene per centimeter length of the fuel assembly, and will not exceed a total of 6.99 kg per fuel assembly.

6.2.2 Individual Fuel Package Loading Criteria

- Fuel package loading sets #1, #2, and #3 are identical

6.3 Model Specification

6.3.1 Description of Calculational Model

- Descriptions are identical

Configuration (1)

- Identical

Configuration (2)

- Identical

Configuration (3)

- Identical

Configuration (4)

- Identical

Configuration (5)

- Identical

Configuration (6)

- Identical

6.3.1.1 Normal Transportation Mode

- Identical

6.3.1.2 Accident Transportation Mode

- Identical

6.3.2 Package Regional Densities

- Figure 6-31 in the Patriot SAR is the same as Figure 6-24 in the CE-B1 SAR.

6.4 Analysis Results

6.4.1 Normal Transportation Mode

- Identical

6.4.1.1 Normal Transportation Mode -Dry Condition

- Identical

6.4.1.2 Normal Transportation Mode -Damp Condition

- Identical

6.4.2 Accident Transportation Mode

- Identical

6.4.2.1 Fuel Package Loading 1

- Identical

6.4.2.2 Fuel Package Loading Set 2

- Identical

6.4.2.3 Fuel Package Loading Set 3

- Identical

6.4.3 Enrichment Zoning and Pellet Diameter Effects

- Identical

6.4.4 NOT IN CE-B1 SAR.

6.4.4 Evaluation of Changes in Assembly Rod Pitch

Accident transportation mode analyses were carried out for fuel package loading set 2, fuel assembly configuration (6) and shim pattern X, to explore the effects of changes in rod pitch, changes in row spacing, and changes to individual sub-bundle assemblies. The purpose for this evaluation is to demonstrate, that based on the results of the hypothetical accident tests performed in accordance with 10 CFR 71.73, the reactivity of the fuel within the shipping package as well as the analyzed array of shipping packages remains subcritical.

The evaluation focused on determining the change in reactivity of the array, relative to a base value, that is associated with systematic changes in the rod pitch within an assembly. As mentioned above, the base value was chosen as the most adverse case outlined in Section

6.4.2.2, i.e., Fuel Loading 2, Assembly configuration (6) with shim pattern X. This orientation resulted in a maximum unbiased effective multiplication factor of 0.91946 + 0.00143 with a 3% interstitial moisture density. Using this value as a basis the following series of geometric perturbations were examined.

The third and fourth cases shown in Figure 6.25 and 6.26 are more representative of the actual damage sustained in the first of the two accident test sequences performed. The rods on the corners of the assembly compressed against the adjacent rods and remained that way due to permanent deformation of the spacer grids. In both Figure 6.25 and Figure 6.26, the vertical pitch of the rods remained unchanged from the normal dimension, and the rods were compressed radially. The case shown in Figure 6.25 has only compression of the corner pins in the top and bottom two rows within the assembly. The reactivity of this configuration decreased 0.4% relative to the base value. The case shown in Figure 6.26 has a greater degree of radial compression and results in a decrease of 1.6% in reactivity. These calculations demonstrate that a reduction in rod pitch results in a decrease in reactivity.

The fifth case was run to determine the cumulative effect of both an increase in pitch between rows vertically, and a decrease radially in rod pitch within each row. As shown in Figure 6.27 the vertical pitch of each row was increased from the base case by 0.20 cm while the rods in each row were compressed to simulate a radial geometry. The result was a net decrease in reactivity of 0.48%. Therefore it can be concluded that the decrease in reactivity due to the compressed rod regions is greater than the increase in reactivity associated with the increase in separation of rods, and that the asymmetry of the assembly results in a net decrease in reactivity.

The final two cases involve uniform compression of the rods in the horizontal direction, and spreading of the rods in the vertical direction. These configurations are shown graphically in Figure 6.28 and 6.29. The configuration in 6.28 shows the horizontal compression of the left two sub-bundles and vertical expansion of all rows by 0.2 cm. Figure 6.29 shows a uniform horizontal compression of all four sub-bundles along with the same vertical expansion. Both cases resulted in a net decrease in reactivity of 0.1% and 1.0% respectively.

In summary, as demonstrated by the calculations performed in this section, that asymmetric rod orientations within the assembly consistent with those associated with the hypothetical accident tests results provide a net decrease in reactivity.

6.5 Validation of Calculational Methods and Bias Evaluation

6.5.1 Benchmark Experiments

- Identical

6.5.2 Calculational Bias Evaluation

- Identical

6.5.3 Evaluation of K95/95 Values

- Identical
- Figure 6-30 in the Patriot SAR is Figure 6-23 in the CE-B1 SAR

Tables

- Table 6.1 Identical
- Table 6.2 Identical
- Table 6.3 Identical
- Table 6.4 Identical
- Table 6.5 Identical
- Table 6.6 Identical
- Table 6.7 Identical
- Table 6.8 Identical

Figures

- Figure 6.1 Identical
- Figure 6.2 Identical
- Figure 6.3 Identical
- Figure 6.4 Identical
- Figure 6.5 Identical
- Figure 6.6 Identical
- Figure 6.7 Identical
- Figure 6.8 Identical
- Figure 6.9 Identical
- Figure 6.10 Identical
- Figure 6.11 Identical
- Figure 6.12 Identical
- Figure 6.13 Identical
- Figure 6.14 Identical
- Figure 6.15 Identical
- Figure 6.16 Identical
- Figure 6.17 Identical
- Figure 6.18 Identical
- Figure 6.19 Identical
- Figure 6.20 Identical
- Figure 6.21 Identical
- Figure 6.22 Identical
- Figure 6.23 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.24 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.25 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.26 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.27 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.28 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.29 Not in CE-B1 SAR. Referenced in Section 6.4.4
- Figure 6.30 Same as Figure 6-23 in CE-B1 SAR
- Figure 6.31 Same as Figure 6-24 in CE-B1 SAR

Enclosure 3: Proposed Wording for Revised Patriot Certificate of Compliance

5. (a) (2) Description

The second paragraph of the Patriot CoC rev 3 reads:

> The metal inner container is approximately 11-1/4 inches high by 18-1/8 inches wide by 179-3/4 inches long. There are two channel sections within the inner container, and each channel section holds one BWR fuel assembly. The inner container is equipped with a lid and an end cap that are closed by 18 bolts and fastening lugs. The overall dimensions of the wooden outer container are approximately 30-1/4 inches wide by 31-3/4 inches by 207-1/2 inches long. The cushioning material between the inner and outer containers is phenolic impregnated honeycomb and ethafoam. The inner container may be positioned on a series of vibration dampers mounted on the inside bottom of the wooden outer container.

Recommend revising paragraph 2 as follows:

> *There are two versions of the metal inner container. Both measure approximately 11-1/4 inches high by 18-1/8 inches wide by 182 inches long.* There are two channel sections within the inner container, and each channel section holds one BWR fuel assembly. The inner container is equipped with a lid and an end cap that are closed by 18 bolts and fastening lugs. The overall dimensions of the wooden outer container are approximately 30-1/4 inches wide by *31-1/4* inches high by *207-3/4* inches long. The cushioning material between the inner and outer containers is phenolic impregnated honeycomb and ethafoam. The inner container may be positioned on a series of vibration dampers mounted on the inside bottom of the wooden outer container.

Recommend revising paragraph 3 as follows:

> *The maximum weight of the package, including contents, is 2,988 pounds with the version #1 inner container and 2,964 pounds with the version #2 (optional) inner container.*

5. (a) (3) Drawings

Add the following lines:

10015E58, Sheets 1 and 2, Rev. 1
Figure 8-1 of the License Application
Figure 8-7 of the License Application
Figure 8-9 of the License Application

Recommend new paragraph 9 as follows:

9. Only optional inner containers with Serial Numbers 001 through 039, inclusive, are authorized for use. No other inner containers may be used which conform to drawing #10015E58.

Renumber condition 9 and 10 as conditions 10 and 11, respectively.

Enclosure 4: Proposed Change Pages to the SAR

Westinghouse Electric Company, LLC

Columbia Fuel Fabrication Plant

Columbia, SC

Application for Certificate of Compliance for the Patriot BWR Fuel Shipping Package

NRC Certificate of Compliance

USA / 9292 / AF-85

Docket 71-9292

Initial Submittal:	September 2004
Revision 1:	April 2005
Revision 2:	June 2005
Revision 3:	September 2005
Revision 4:	January 2006

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2-14	0	6-14	0	6-58	0	6A-35	1
2-15	0	6-15	0	6-59	0		
2-16	0	6-16	0	6-60	0	7-1	0
2-17	0	6-17	0	6-61	0	7-2	0
2-18	0	6-18	0	6-62	0	7-3	0
2-19	0	6-19	0	6-63	0		
2-20	0	6-20	0	6-64	0	8-1	4
2-21	0	6-21	0	6-65	0	8-2	4
2-22	0	6-22	0	6-66	0	8-3	4
2-23	0	6-23	0	6-67	0	8-4	4
2-24	0	6-24	0			8-5	4
2-25	0	6-25	0	6A-1	0	8-6	4
2-26	0	6-26	0	6A-2	0	8-7	4
2-27	0	6-27	0	6A-3	0	8-8	4
2-28	0	6-28	0	6A-4	0		
2-29	0	6-29	0	6A-6	2		
2-30	0	6-30	0	6A-7	1		

8 ACCEPTANCE TESTS AND MAINTENANCE PROGRAM

8.1 Acceptance Tests

The PATRIOT inner shipping packages may be purchased either used or new. Prior to their initial use as a PATRIOT container, each of the licensed containers will be inspected and verified to meet the requirements of the drawing. This will be accomplished through a Commercial Grade Dedication or Receipt Inspection program, as applicable. The program will consist of inspections and evaluations as described below.

Design change(s) affecting the package safety envelope, defined by structural integrity and demonstrated via testing (Section 2.0), and criticality safety analyses (Section 6.0), shall be submitted to the U.S. Nuclear Regulatory Commission (NRC) for approval.

Design change(s) not affecting the safety envelope shall be documented and justified. If such non-safety related changes do not affect any engineering drawings or page(s) of this application they may be implemented without seeking prior NRC approval. However, if non-safety related changes do affect any engineering drawings or page(s) of this application, the application shall be appropriately revised and submitted to the NRC pursuant to 10CFR71 for review and approval prior to implementation.

8.1.1 Visual Inspections and Measurement

The majority of the Commercial Grade Dedication (used containers) or Receipt Inspection (new containers) program for the inner containers will consist of visual examinations and dimensional measurements. The dimensions important to safety will be identified and measured, using controlled instrumentation, by qualified technicians and the results compared with established acceptance criteria. Visual examinations will assess the overall condition of the container and ensure that the container is adequate for transport of nuclear fuel.

8.1.2 Weld Examinations

The welds on inner containers purchased used will be visually examined on each container to verify they meet the design requirements as specified in Section 2 of this document. In addition, a destructive examination will be performed on a sample of the containers.

On containers fabricated new, the welding will be performed in accordance with procedures which meet the specified standards and performed by personnel qualified on those procedures. Visual exams will be made on all welds and may be supplemented by non-destructive and destructive testing as required by the referenced standard.

8.1.3 Structural and Pressure Tests

The design of the PATRIOT package has been verified through the testing described in Section 2 and Section 3 of this document. Each package will be verified to meet the design requirements, and no additional structural tests are required. The PATRIOT package is not a pressure container and no pressure tests are required.

8.1.4 Leakage Tests

The PATRIOT package is not a containment boundary, and therefore no leak tests are required.

8.1.5 Component and Material Tests

A sample of the material from an inner container will be subjected to material testing to ensure that the package meets the design requirements specified in Section 2 of this document.

8.1.6 Shielding Tests

The PATRIOT design does not incorporate any shielding and therefore these tests are not applicable.

8.1.7 Thermal Tests

Decay heat from fresh fuel is negligible and therefore heat transfer tests are not required.

8.2 Maintenance Program

Maintenance of the PATRIOT shipping package is accomplished through an on-going in-service inspection program. Maintenance is performed, as necessary, as a result of the shipping package loading process inspections discussed in

Section 7.1. The PATRIOT shipping packages have no moving parts which require periodic maintenance. Each package is treated as a separate entity and undergoes inspection and replacement of parts or repair when a deficiency is noted during the inspection process. If appropriate replacement or repair cannot be made in a timely manner the package is removed from service until corrective maintenance action is completed.

8.2.1 Cleaning and Painting

A process has been established for cleaning and painting the inner container. The basic process, performed in accordance with approved procedures, includes cleaning (via oven bake), removing the lid end cap, performing an acid strip and neutralization operation, and then re-welding the end cap to the lid. After inspection, the inner container is powder coat painted.

The only portion of this cleaning process that affects the configuration of the inner container is the removal of the lid end cap. The removed end cap has the inner container serial number affixed to the inside, to ensure correct reattachment later in the process.

After the lid has been cleaned and stripped, the end cap is welded to the lid by a qualified welder. The weld is then inspected by qualified weld inspectors. This process does not change the configuration of the inner container lid.

There are three acceptable end cap configurations. The first is shown in license drawing 10014E28. This configuration has a full-length bottom tab and partial-length upper tab. The other two configurations are shown in Figure 8-1, on the next page. One is a simple flat plate and the other has partial-length top and bottom tabs. During the cleaning and painting process described here, the end cap is re-attached as a simple flat plate.

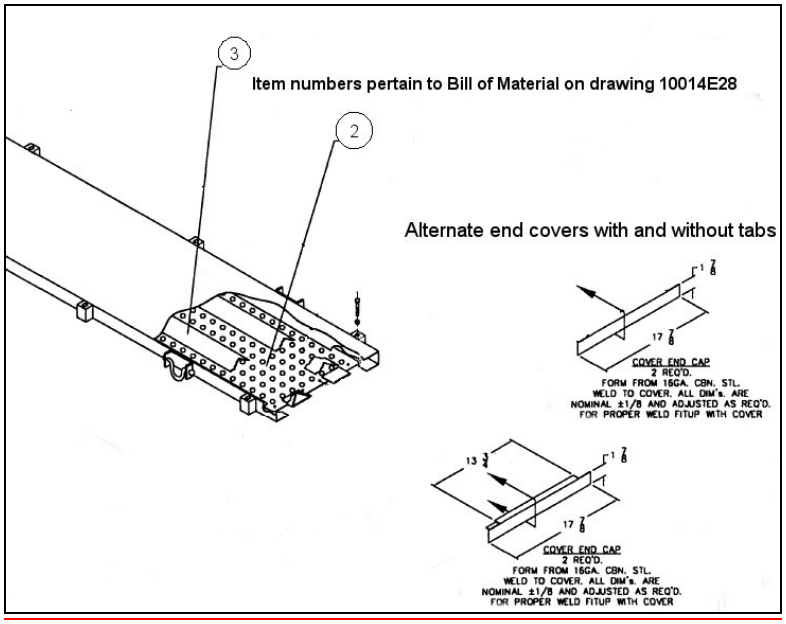

Figure 8-1 Optional inner container lid end cap configurations

8.3 Perforated lid liner – method of attaching to lid

Maintenance activity to the lid liner is limited to cleaning and painting as described above. The perforated lid liner may be attached to the lid by two different methods: overlapping and non-overlapping. Figure 8-2, Figure 8-3, Figure 8-4, and Figure 8-5, below, show examples of the perforated lid liner and inner container lid welded together with no overlap. The non-overlapping method may have the two components folded and welded together as in Figure 8-2 and Figure 8-3, or simply matched and welded as shown in Figure 8-4 and Figure 8-5.

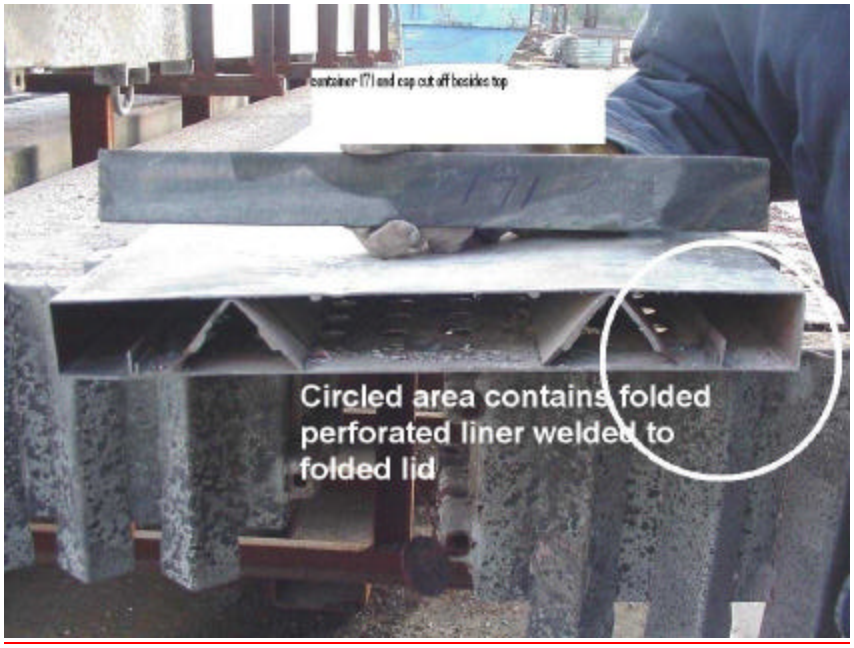

Figure 8-2 Photograph showing end cap removed

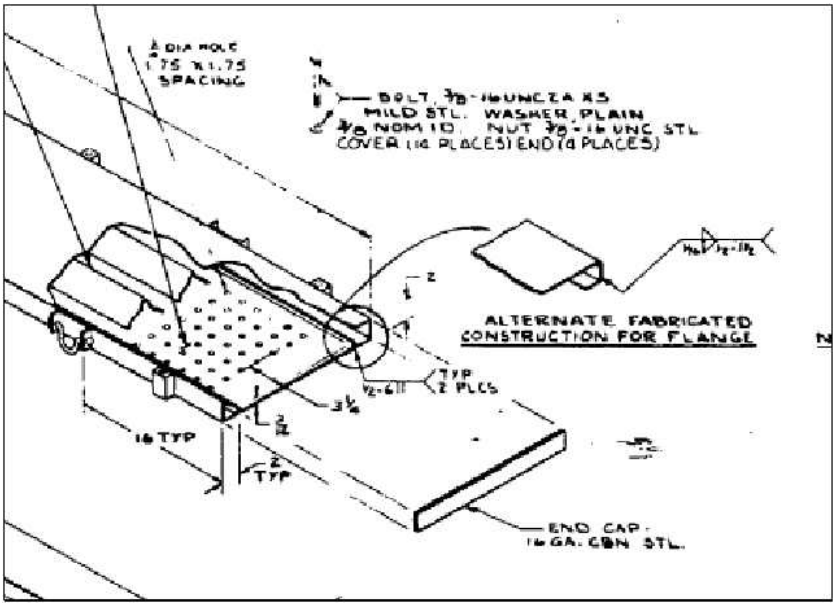

Figure 8-3 Optional lid end cap configurations

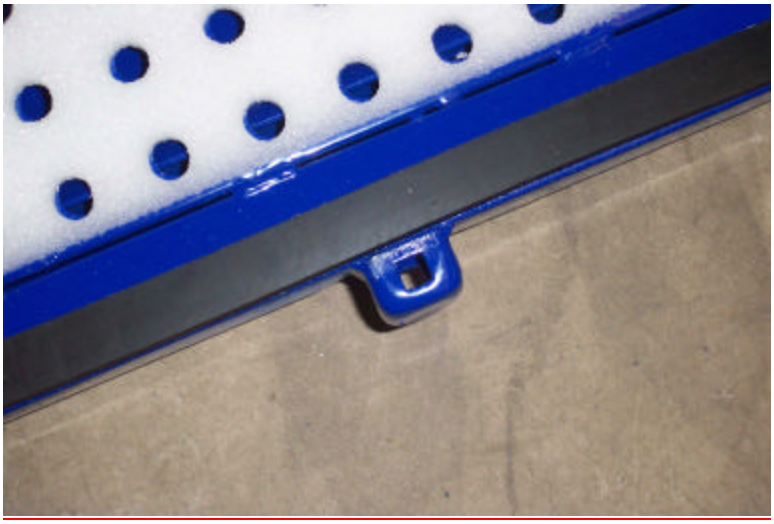

Figure 8-4 Refurbished inner container lid showing welded components

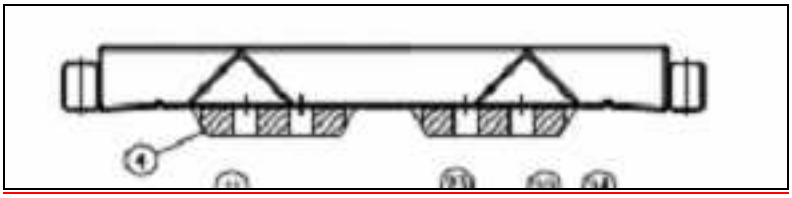

Figure 8-5 Section F-F from License Drawing 10014E28

The second method has the perforated lid liner overlapping the lid and welded to it as shown in Figure 8-6, which shows two photographs of this configuration. Figure 8-7 is a sketch of this configuration.

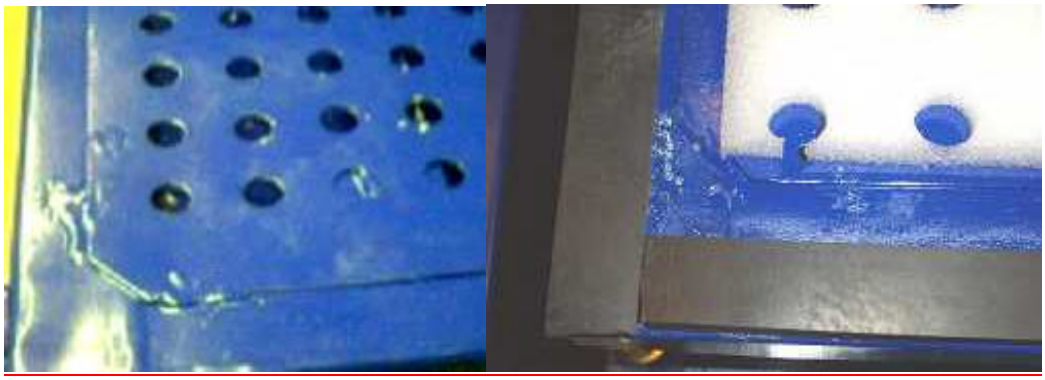

Figure 8-6 Refurbished inner container showing overlapping lid liner

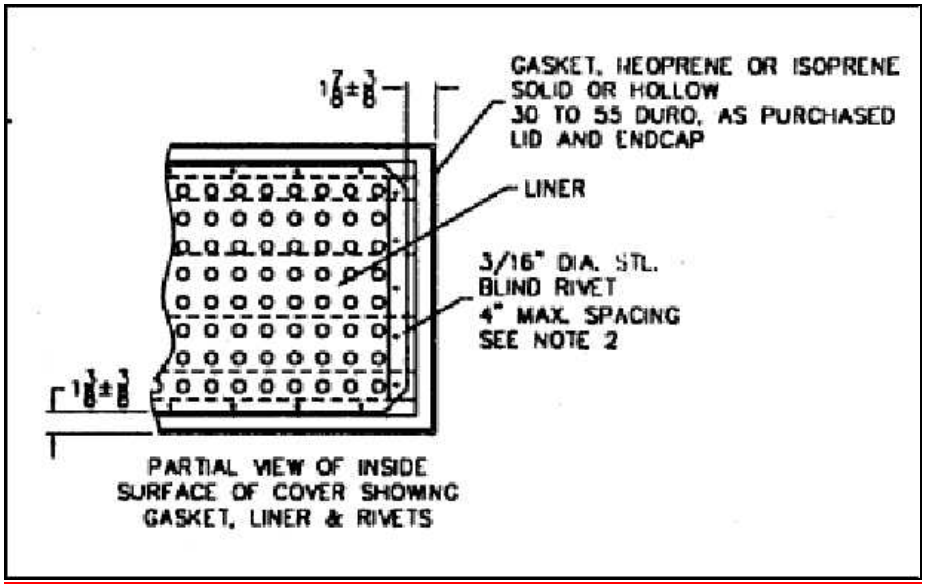

Figure 8-7 Overlapping lid liner

8.4 Baskets (channels) – method of fastening together

Baskets (or channels) may be fastened together with welds, rivets, or clamps as depicted in Figure 8-8 and Figure 8-9.

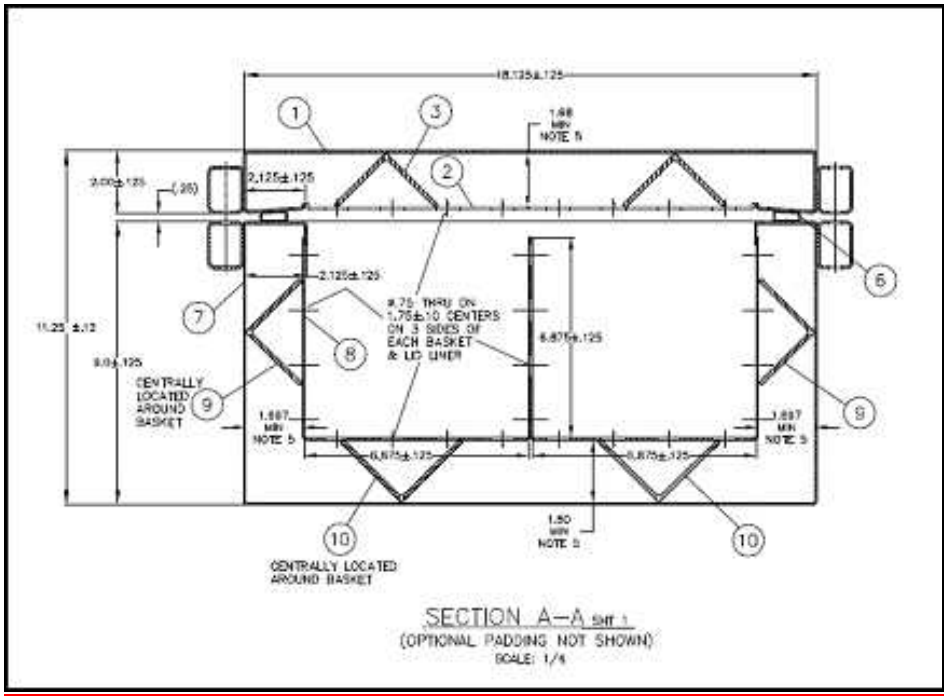

Figure 8-8 Detail of inner base basket from Patriot license drawing 10014E28

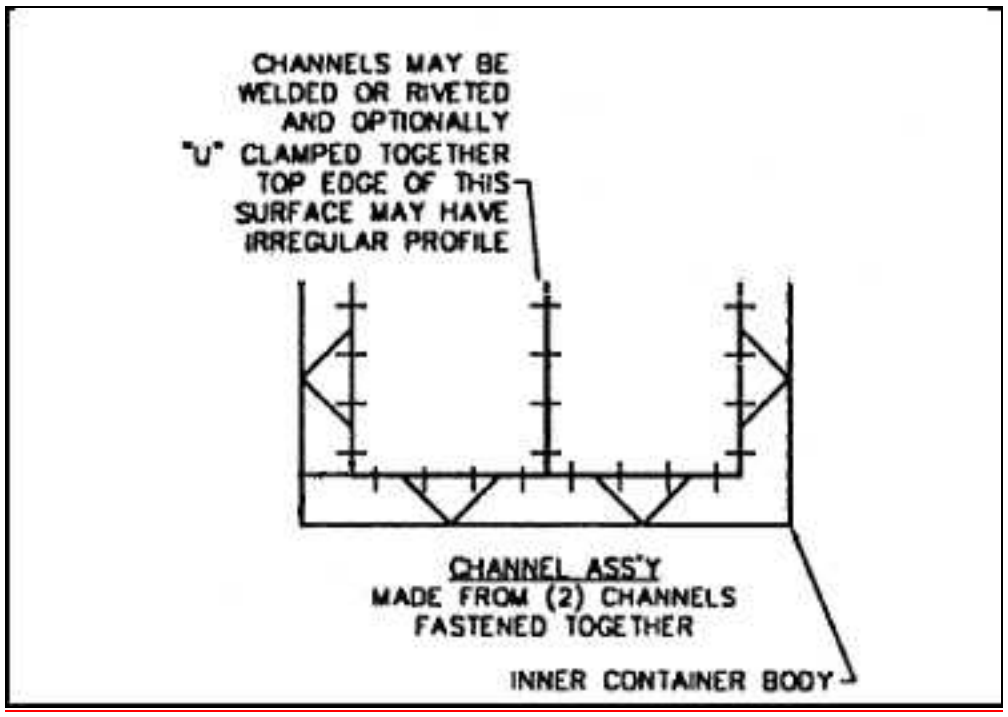

Figure 8-9 Optional basket fastening methods