

71-6078



Westinghouse
Electric Company LLC

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Columbia, SC 29250
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U. S. Nuclear Regulatory Commission
Attn: Mr. E. William Brach, Director
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards
Washington, DC 20555

September 19, 2001
NRC-01-039

Mr. Brach:

Subject: Docket 71-6078, Application for Approval of Packaging: Model 927A1 and 927C1 Shipping Container, Package Identification USA/6078/AF

Westinghouse Electric Company hereby submits six (6) copies of information pursuant to our application for an amendment to the Certificate of Compliance for our model 927 PWR shipping container.

This revision is necessary to correct a single typographical error that was discovered in one of the license drawings. Included in this submittal are:

- Executive Summary describing the nature of the proposed revision
- Justification for the revision
- Proposed revision to the Certificate of Compliance
- Jersey Nuclear Co. Application to the Certificate (formerly SNM-1227) for the Container Model #51032-1 dated October 1971.
- Jersey Nuclear Company Report #2526A, dated September 1971, Engineering Analysis for Shipping and Storage Container for Fuel Assembly.
- Applied Design Drawing #51032-1-003, including magnified section showing original skip weld dimension.
- Revised License Drawing L-6078-01 Sheets 1-4, Rev 5.

Westinghouse regrets the urgency of this request. However, please note that the error was only recently discovered, and a revised certificate is needed to meet a planned shipment date of October 1, 2001. We would appreciate your issuing the revision by September 28, 2001. If you have any questions, please call the undersigned at (803) 647-3552 or Mr. Wes Stilwell at (803) 647-3438.

Sincerely,

WESTINGHOUSE ELECTRIC COMPANY

Norman A. Kent
Norman A. Kent
Senior Engineer
Nuclear Fuel Transport

NMSS01 Public

Executive Summary

NRC Certificate of Compliance USA/6078/AF, paragraph 5(a) (3), references Combustion Engineering, Inc. Drawing No. L-6078-1, Sheets 1-4, Rev. 4, as the drawings by which the Model #927 A1 and C1 containers are constructed. During a recent review of the Model #927 Safety Analysis Report (SAR), it was discovered that Drawing L-6078 sheet 3 contained a typographical error relating to the skip welds on the center stiffening ring. The License Drawing has been corrected.

Technical Justification

License Drawing L-6078-01 Sheet 3 shows the typical skip weld pattern for the stiffening ring to be $\frac{1}{8}$ - $2\frac{1}{2}$ - 2. That is, the welds should be $\frac{1}{8}$ x $2\frac{1}{2}$ -inch long beads, with 2-inch center-to-center spacing. It was recognized that it is physically impossible for $2\frac{1}{2}$ -inch long welds to have 2-inch center-to-center spacing. Investigation revealed that the correct center-to-center spacing is 8 inches.

The correct skip weld pattern is found in 1971 design drawings for the FRAMATOME-ANP #51032-1 PWR container. Section 2B-2 of the Model #927 Container Safety Analysis Report states that the Model #927 is virtually identical to the Framatome-ANP Model #51032-1 PWR shipping container. The container type (including Models #927 and #51032) was co-designed by Jersey Nuclear Company and Applied Design. Both Safety Analysis Reports reference the same joint Jersey Nuclear Co. report on the acceptance testing of the #51032 container. Both SAR's indicate that the containers are virtually identical.

The Applied Design Drawing for the #51032, drawing #51032-1-003 dated September 21, 1971, shows that the cover assembly skip weld pattern should be $\frac{1}{8}$ - $2\frac{1}{2}$ -8. It follows, therefore, that the acceptable typical weld pattern for the stiffening ring of the Model #927 container should also be $\frac{1}{8}$ - $2\frac{1}{2}$ -8.

Attached to this report are two documents dating from 1971, which identify the two container types (Model #927 and #51032) as being essentially identical. The documents are:

- October 1971 Jersey Nuclear Co. Application to the Certificate (formerly SNM-1227) for the Container Model #51032-1.
- Jersey Nuclear Company Report #2526A, Engineering Analysis for Shipping and Storage Container for Fuel Assembly.

Proposed Wording of Certificate of Compliance

Please revise the Certificate of Compliance to read as follows:

Paragraph 5.(a) (3):

Drawings

The Model Nos. 927A1 and 927C1 containers rare constructed in accordance with Combustion Engineering, Inc. Drawing No. L-6078, sheets 1-4, Revision 5.

APPLICATION

For

AMENDMENT TO LICENSE NO. SNM-1227

For

SHIPMENTS OF NUCLEAR FUEL ASSEMBLIES IN JERSEY NUCLEAR COMPANY'S

NUCLEAR FUEL ASSEMBLY PACKAGING MODEL 51032-1

October, 1971

JERSEY NUCLEAR COMPANY

Richland, Washington

RECEIVED

APPLIED ENGINEERING CO., INC.

MAR 10 1972

APPLICATION

For

AMENDMENT TO LICENSE NO. SNM-1227

For

SHIPMENT OF NUCLEAR FUEL ASSEMBLIES IN JERSEY NUCLEAR COMPANY'S
NUCLEAR FUEL ASSEMBLY PACKAGING MODEL 51032-1

1.0 INTENT

Amendment to License No. SNM-1227 is sought authorizing the delivery of special nuclear material (unirradiated low-enriched UO_2 and unirradiated mixed oxide-- $PuO_2 - UO_2$ --fuel assemblies) in Model 51032-1 packaging to carriers for transport, by exclusive use of motor vehicles and under Fissile Class III conditions, to nuclear reactor sites.

The Model 51032-1 packaging was co-designed by Jersey Nuclear Company and Applied Design Company, Inc., and fabricated by the latter Company. Although this is a new model, it is very similar to several previous packaging designs which have been tested, licensed (including DOT Special Permits), and are presently in use. These similar packaging models are listed below:

- (a) Model UNC-2800, License No. SNM-777, Amendment No. 71-19, Special Permit No. 5419 (see Reference 1);
- (b) Model 927A, License No. SNM-1067, Amendment No. 71-2, Special Permit No. 6078 (see Reference 2);
- (c) Model 927B, License No. SNM-1067, Amendment No. 71-3, Special Permit No. 6078, Rev. 1 (see Reference 3);
- (d) Model 927C, License No. SNM-1067, Amendment No. 71-3, Special Permit No. 6078, Rev. 1 (see Reference 3).

The design of packaging Model 51032-1 is based on the Model 927C packaging. Only those changes were made that were necessary to meet Jersey Nuclear Company specifications. However, in all structural and containment respects, the Model 51032-1 packaging is equal to or better than the Model 927C packaging (see Appendix I, Applied Design Co., Inc., "Report No. 2526A"). Throughout this application, demonstration that

- 1.2 -

the Model 51032-1 packaging meets 10CFR71 requirements will be by comparison to packaging Models UNC-2800, 927A, and 927C, supported by additional engineering evaluations where necessary.

Model 51032-1 packaging specifications, fuel assembly compositions and configurations, along with analysis, results, and method verifications are detailed below.

- 2.1 -

2.0 PACKAGING DESCRIPTION (10CFR71.22)(a) With Respect to Packaging

- (1) The Gross Weight of the packaging is 4000 pounds.
- (2) The Model Number is 51032-1.
- (3) The Specific Materials of Construction, Weights, Dimensions and Fabrication Methods of the packaging components are described below:

(i) The Contaminant Vessel is a 43.25-inch right cylinder 216.25 inches long and fabricated of 11 gauge (0.1196 inch) steel (reference JN Drawings 200001 and 200002). The containment vessel is fabricated in two sections (base and cover assemblies, reference ADC Drawings 51032-1-002 and 51032-1-003). Continuous 2 x 2 x 1/4-inch closure flanges are welded to the base and cover assemblies. A 1/2-inch continuous rubber "O" ring gasket is fitted between the mating flanges. Using ten 1/2-inch steel alignment pins permanently fixed in the closure flange of the base assembly, the two halves of the containment vessel are mated and sealed together with fifty-eight 1/2-inch 13UNC-2A steel closure bolts; steel washers (9/32-inch thick) are inserted between the mating flanges to prevent excessive distortion of the "O" ring gasket; 1/2-inch 13UNC-2B steel nuts tightly seated complete the closure.

Seven steel stiffening rings (5 rollover angles and 2 end rings) are welded to each of the base and cover assemblies to strengthen the containment vessel shell; rollover rings are fabricated of 2-1/2 x 2-1/2 x 5/16-inch angles, and end rings are fabricated of 3-1/2 x 2-1/2 x 3/8-inch angles.

Four 7-gauge (0.1793-inch) steel skids are welded to the base assembly. These skids support the package,

- 2.2 -

and are designed to be bolted to the stacking brackets when packages are stacked, for storage or transport.

Four sets (2 per set) of stacking brackets fabricated of 7-gauge (0.1793-inch) steel are welded to the cover assembly.

Welded to each set of stacking brackets is a steel lifting lug. These four lugs are fabricated of 3/8-inch steel and are used for lifting the cover assembly only.

Two lift fork pickup channels are welded to the base assembly to facilitate package handling; these channels are fabricated of 1/4-inch steel.

Fourteen (7 per side) shock-mount support brackets are welded to the interior side of the base assembly shell; these brackets are fabricated of 1/4-inch steel. The full weight of the fuel assemblies and the support mechanisms is transferred to these brackets through 14 shock mounts, as further discussed (in iii) below.

The Model 51032-1 containment vessel is identical to the Model 927C containment vessel. There have been no structural changes. The capability of the container structure was proven by tests of the Model 927A container (see Appendix I).

- (ii) There are no Materials Specifically Used as Non-Fissile Neutron Absorbers or Moderators in this packaging.
- (iii) The snock mounted strongback is considered to be an Internal Structure Supporting and Protecting the fuel

Report No. 2526A
Engineering Analysis
for
Shipping and Storage Container
for
Fuel Assembly
for
Jersey Nuclear Company
Richland, Washington

APPLIED DESIGN COMPANY, INC.
Tonawanda, New York 14150

September 17, 1971

Report No. 2526A
Engineering Analysis
for
Shipping and Storage Container
for
Fuel Assembly
for
Jersey Nuclear Company
Richland, Washington

Jersey Nuclear Company Purchase Order No. R985 is dated July 8, 1971 and is placed on Applied Design Company. This purchase order covers the design, fabrication and test of Fuel Assembly Shipping Containers in accordance with Jersey Nuclear Purchase Specification JNPS-7 which is dated June 28, 1971.

A portion of this purchase order covers the supply of data which is necessary to obtain a license from the Atomic Energy Commission and the Department of Transportation. It is the purpose of this engineering analysis to supply this data.

SUMMARY:

This engineering analysis proves that the container is equal to or greater in strength than two similar containers which have been previously licensed. Accordingly, it is concluded that this container includes the required structural integrity to be qualified as a licensed container.

DISCUSSION:

This analysis compares the structural capability of Applied Design Company (ADC) Model 51032-1 Container with ADC Models 927A and 927C Containers.

ADC Model 927A Container satisfactorily passed the applicable AEC tests and is licensed. Special Permit No. 6078 is assigned to this container. The Model 927A was designed to carry the Palisades Fuel Assembly.

ADC Model 927C Container is also licensed. Special Permit No. 6078 Revision 1 is assigned. The Model 927C is a modification of the Model 927A and is 28-inches longer. There are other structural differences that will be discussed later. This container is designed to carry two fuel assemblies that are slightly heavier than the maximum weight listed in Specification JNPS-7.

The design of ADC Model 51032-1 Container is based on the Model 927C Container. Only those changes were made that were necessary to meet

the requirements of Specification JNPS-7. Each load carrying member of the container is discussed in the following paragraphs.

The external container is identical to the Model 927C Container. There are no structural changes. The capability of the container structure was proven by test of the Model 927A Container.

The elastic suspension is identical to the Model 927C Container. There are 14 mounts in the Models S1032-1 and 927C Container, 12 in the Model 927A Container. The addition of one pair of mounts maintains the same mount spacing in all three containers. Structural components of the suspension system including mount brackets, mounts and support tubes are identical to the Model 927C Container. The load on each mount is maintained at a nearly constant level by varying the number of mounts in accordance with the weight of the lading. The actual static load imposed on each mount is shown in the calculations in Appendix I.

The strongback structure is identical to the Model 927C strongback except for the addition of holes and slots to permit positioning of support pads and separators. This strongback is substantially stronger and stiffer than the strongback that was tested in the Model 927A Container. The strongback consists of one formed piece of metal with the same stiffening angles as were used on the Model 927A strongback. The Model 927A strongback consisted of two formed side rails welded to the stiffening angles. The lading was supported on a separate structure bolted to the stiffening angles.

The end thrust brackets are similar to the thrust brackets in the Models 927A and 927C Containers. The section modulus is greater as is shown by the calculations in Appendix I. Attachment of the brackets to the strongback is identical to the Models 927A and 927C Containers.

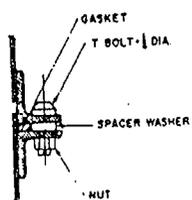
The section modulus of the center thrust bracket is approximately equal to the thrust brackets in the Models 927A and 927C Containers, although maximum load imposed on this bracket is only one-third of that imposed on the end brackets. Strength of attachment bolts is approximately 40% of the end thrust brackets. This results in a reduced stress in the attachment bolts which is approximately 82.5% of the end bracket bolts.

Clamp assemblies that retain the two large fuel assemblies are identical to the clamp assemblies in the Models 927A and 927C

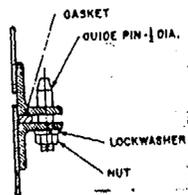
Containers. This clamp assembly was modified to accommodate the smaller fuel assemblies: An extension was added to the fixed portion of the assembly and a smaller adjustable clamp was designed. This provides a structure that is substantially equal to the clamps for the large fuel assemblies while the maximum load imposed is less than one-half of that incurred in the large fuel assembly clamps.

The separators are identical to those in the Model 927C Container except for length. The separators in this container are longer to permit longitudinal adjustment. Attachment of the separators to the strongback is identical to the Model 927C Container.

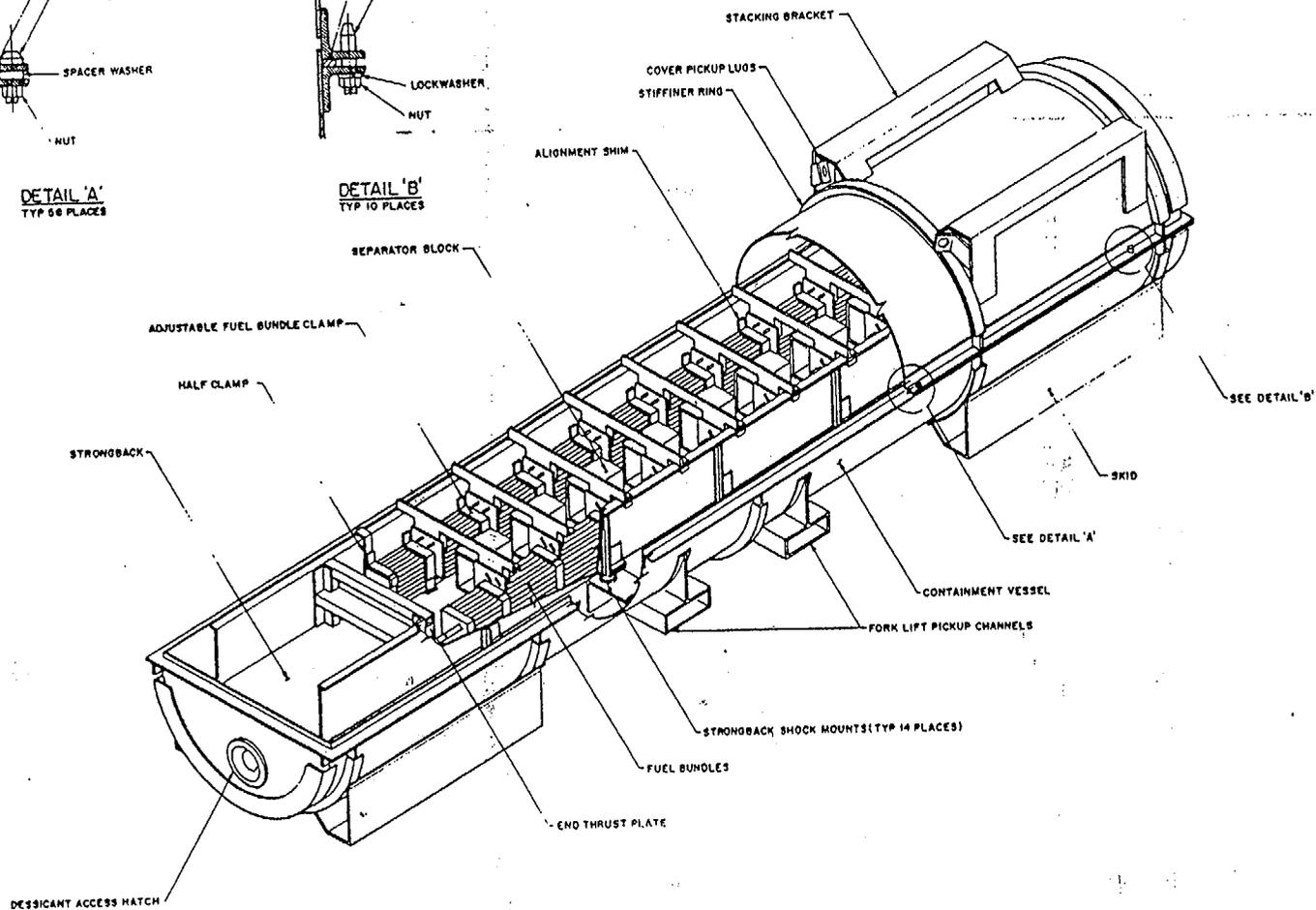
Total length of separators is 76.5 inches, an increase of 27 per cent over total separator length in the Model 927C Container. This increases the amount of structure available for the containment of the fuel assemblies during any sidewise loading which might be imposed. The strongback is designed such that the separators can be arranged to limit the distance between any adjacent separator to a maximum of 14-inches.



DETAIL 'A'
TYP 66 PLACES



DETAIL 'B'
TYP 10 PLACES



JERSEY Jersey Nuclear Company
AN AMERICAN COMPANY

FUEL PACKAGING MODEL
 N^o 51032-1 ISOMETRIC

REVISIONS		REFERENCE DRAWINGS	
NO.	DATE	NO.	DATE
1	8-15-61	1	8-15-61

JN-200001

FIGURE WITHHELD UNDER 10 CFR 2.390

<p>APPROVAL DESIGN ENGINEER SIGNATURE AND LICENSE NO. DATE SPECIFIED ON THIS DRAWING OR THE DRAWINGS IS VALID ONLY WHEN THE ENGINEER'S SIGNATURE AND LICENSE NO. ARE PRINTED ON THE DRAWING. THE SIGNATURE MUST BE IN INK.</p>			<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES, TOLERANCES ON</p> <p>FRACTIONS DECIMALS ANGLES</p> <p>$\pm \frac{1}{32}$ 0 - 0.001</p>	<p>DATE 8-5-71 DRAWN BY HCL 9-2-71</p>	<p>AD APPLIED DESIGN <small>2 EAST 42ND ST TORONTO, ONT. M2H 1P8</small></p>	
						<p>PROJECT NO. 51032-1-003</p> <p>DATE 8-5-71</p> <p>APPROVAL DESIGN ACTIVE</p>
					<p>93421</p>	<p>D 51032-1-003</p>
					<p>APPROVAL OTHER</p>	<p>93709</p>

FIGURE WITHHELD UNDER 10 CFR 2.390

D 51032-1-003
magnified

FIGURE WITHHELD UNDER 10 CFR 2.390

5	YES	9/17/01	<i>MD</i>	9/19/01	REVISED WELD DIM SH. 3 ZONE 2A FROM 2 1/2 - 2. TO 2 1/2 - 8
4	DCH	8/13/98			REVISED TITLE BLOCK TO REFLECT COMPANY CHANGE SH. 1-4 REVISED NOTE #4, SECT. E-E, TO ADD 1/4" TO WELD CALLOUT RETIRED SECTION E-E PER DRAWING SECTION (A-2), SH. 2
3	DEM	7/29/98			REMOVED DIMENSIONS, RELOCATED ITEM 47 TO AGREE WITH SECTION E-E (C-1) ADDED NOTES 4, 5 & 6 TO SECT. VIEW E-E PER DRAWING SECT. (A-2) SH. 2
2	DCH	6/10/98			CHANGED MATERIAL CALLOUT OF ITEMS 12 & 36 FROM C. STEEL TO STEEL
1	DEM	6/4/98			CHANGED WELD CALLOUT FROM 1/8 TO 1/4 FOR SECT. M-M
REV	BY	DATE	APP'D	DATE	DESCRIPTION
DRAWN BY: D. MOSBY				5/6/98	 WESTINGHOUSE ELECTRIC COMPANY LLC NUCLEAR FUEL COLUMBIA, SC USA
- APPROVALS -					
FACILITIES ENGINEER:		<i>[Signature]</i> 9/19/01			
QUALITY MANAGER:		<i>[Signature]</i> 9/19/01			
REG. AFFAIRS:		<i>[Signature]</i> 8/15/01			
OTHERS/					
SCALE: 1" = 1'		927 SHIPPING CONTAINER			
TOLERANCES UNLESS OTHERWISE SPECIFIED					
FRACTIONAL	± _____				
DECIMAL	± _____				
ANGULAR	± _____				
SHT 1 OF 4		DRAWING NUMBER		L-6078-01	
				5	

FIGURE WITHHELD UNDER 10 CFR 2.390

5	WES	9/17/01	<i>WES</i>	9/19/01	REVISED WELD DIM SHT. 3 ZONE 2A FROM 2 1/2 - 2, TO 2 1/2 - 8 REVISED TITLE BLOCK TO REFLECT COMPANY CHANGE SHE. 1-4	
4	DCM	8/13/98			REVISED NOTE #4, SECT. E-E, TO ADD 1/4" TO WELD CALLOUT RETITLED SECTION E-E PER DRAWING SECTION (A-2), SHT. 2	
3	DCM	7/29/98			REMOVED DIMENSIONS, RELOCATED ITEM 47 TO AGREE WITH SECTION E-E (C-1) ADDED NOTES 4, 5 & 6 TO SECT. VIEW E-E PER DRAWING SECT. (A-2) SHT. 2	
2	DCM	6/19/98			CHANGED MATERIAL CALLOUT OF ITEMS 12 & 36 FROM C. STEEL TO STEEL	
1	DCM	6/4/98			CHANGED WELD CALLOUT FROM 1/8 TO 1/4 FOR SECT. M-M	
REV	BY	DATE	APP'D	DATE	DESCRIPTION	
DRAWN BY: D. MOSBY				5/6/98	 WESTINGHOUSE ELECTRIC COMPANY LLC NUCLEAR FUEL COLUMBIA, SC USA	
- APPROVALS -						
FACILITIES ENGINEER:		<i>WES 9/19/01</i>				
QUALITY MANAGER:		<i>WES 9/19/01</i>				
REG. AFFAIRS:		<i>WES 5/15/01</i>				
OTHERS/						
SCALE: 1/8" = 1"						
TOLERANCES UNLESS OTHERWISE SPECIFIED						
FRACTIONAL ± _____						
DECIMAL ± _____						
ANGULAR ± _____						
927 SHIPPING CONTAINER						
SHT 2 OF 4		DRAWING NUMBER		L-6078-01		
					REV 5	

FIGURE WITHHELD UNDER 10 CFR 2.390

5	YES	9/17/01	<i>WCA</i>	<i>9/19/01</i>	REVISED WELD DIM SHIT. 3 ZONE 2A FROM 1 1/2 - 2, TO 2 1/2 - 8 REVISED TITLE BLOCK TO REFLECT COMPANY CHANGE SHIT. 1-1	
4	DEM	8/13/98			REVISED NOTE #4, SECT. E-E, TO ADD 1/4" TO WELD CALLOUT RETTLED SECTION E-E PER DRAWING SECTION (A-2) SHIT. 2	
3	DEM	7/29/98			REMOVED DIMENSIONS, RELOCATED ITEM 47 TO AGREE WITH SECTION E-E (C-1) ADDED NOTES 4, 5 & 6 TO SECT. VIEW E-E PER DRAWING SECT. (A-2) SHIT. 2	
2	DEM	6/19/98			CHANGED MATERIAL CALLOUT OF ITEMS 12 & 36 FROM C, STEEL TO STEEL	
1	DEM	6/4/98			CHANGED WELD CALLOUT FROM 1/8 TO 1/4 FOR SECT. M-U	
REV	BY	DATE	APP'D	DATE	DESCRIPTION	
DRAWN BY: D. MOSBY <i>3/6/98</i>					 WESTINGHOUSE ELECTRIC COMPANY LLC NUCLEAR FUEL COLUMBIA, SC USA	
- APPROVALS -						
FACILITY'S ENGINEER: <i>Westinghouse 9/19/01</i>						
QUALITY MANAGER: <i>S. ... 9/19/01</i>						
REC. AFFAIRS: <i>... 08/11/01</i>						
OTHERS/					927 SHIPPING CONTAINER	
SCALE: 1" = 1'						
TOLERANCES UNLESS OTHERWISE SPECIFIED FRACTIONAL: ± _____ DECIMAL: ± _____ ANGULAR: ± _____						
SHT 3 OF 4		DRAWING NUMBER			L-6078-01	REV 5

FIGURE WITHHELD UNDER 10 CFR 2.390

5	WES	9/17/01	<i>Leo</i>	<i>9/19/01</i>	REVISED WELD DIM SHT. 3 ZONE 2A FROM 2 1/2 - 2, TO 2 1/2 - 0 REVISED TITLE BLOCK TO REFLECT COMPANY CHANGE SHT 1-4
4	DEM	9/13/98			REVISED NOTE #4, SECT. E-E, TO ADD 1/8" TO WELD CALLOUT RETIRED SECTION E-E PER DRAWING SECTION (A-2), SHT. 2
3	DEM	7/29/98			REMOVED DIMENSIONS, RELOCATED ITEM #7 TO AGREE WITH SECTION E-E (C-1) ADDED NOTES 4, 5 & 6 TO SECT. VIEW E-E PER DRAWING SECT. (A-2) SHT 2
2	DEM	6/19/98			CHANGED MATERIAL CALLOUT OF ITEMS 12 & 36 FROM C. STEEL TO STEEL
1	DEM	6/4/98			CHANGED WELD CALLOUT FROM 1/8 TO 1/4 FOR SECT. U-M
REV	BY	DATE	APP'D	DATE	DESCRIPTION
DRAWN BY: D. MOSBY 5/6/98					 WESTINGHOUSE ELECTRIC COMPANY LLC NUCLEAR FUEL COLUMBIA, SC USA
- APPROVALS -					
FACILITIES ENGINEER: <i>W. [Signature]</i> 9/19/01					
QUALITY MANAGER: <i>[Signature]</i> 9/19/01					
REG. AFFAIRS: <i>[Signature]</i> 12/19/01					
OTHERS/					
SCALE: 1/8" = 1"					927 SHIPPING CONTAINER
TOLERANCES UNLESS OTHERWISE SPECIFIED					
FRACTIONAL ± _____ DECIMAL ± _____ ANGULAR ± _____					
SHT 4 OF 4			DRAWING NUMBER		L-6078-01
					REV 5