71-9239

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Our ref: UAM-NRC-06-004

January 25, 2006

Subject: Docket 71-9239, Request for Revision to Certificate of Compliance USA/9239/AF

Westinghouse Electric Co. hereby submits an application for revision to the Certificate of Compliance No. 9239 (Docket 71-9239) for the Model Nos. MCC-3 and MCC-4 shipping packages. The requested revision involves modifications to the package contents. There have been no design changes made to the packaging. This revision to the Certificate of Compliance is needed to support fuel deliveries in July 2006.

The CoC currently authorizes five fuel assembly types. This revision request affects the fuel assembly types as indicated below:

CoC Para. 5.(b)(1)	Shipping Package	Fuel Description	Description of Change
(i)	MCC3	14x14	No change
(ii)	MCC3	15X15	No change
(iii)	MCC3 or MCC4	16x16	No change
(iv)	MCC3 or MCC4	17X17	Increase the enrichment requiring the horizontal Gd_2O_3 for 17X17 STD lattice type fuel assembly from 4.65 wt% to 4.85 wt%.
(v)	MCC5	VVER-1000	No change

NMSS01

Enclosure 1 describes and justifies the requested changes. Enclosure 2 contains the pages of the License Application which are changed. Enclosure 3 offers proposed wording for the Certificate of Compliance. Finally, Enclosure 4 contains the current version of the CoC USA/9239/AF including the SER.

If you have any questions, please contact the undersigned at (803) 647-3552.

Sincerely,

WESTINGHOUSE ELECTRIC COMPANY, LLC

Norman A. Kent

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

Enclosures:

Enclosure 1: Description and Justification of Proposed Changes
Enclosure 2: Pages affected in License Application
Enclosure 3: Proposed wording for Certificate of Compliance USA/9239/AF
Enclosure 4: Previous Versions of Certificate of Compliance USA/9239/AF including NRC SER

Enclosure 1 – Description and Justification of Proposed Changes

Background

The NRC Certificate of Compliance (CoC), USA/9239/AF, for the MCC-3, MCC-4, and MCC-5 package requires a horizontal Gadolinia (Gd_2O_3) plate in addition to the vertical Gadolinia plate for fuel assemblies with U-235 enrichments greater than 4.65 wt%. The 17X17 OFA fuel assembly limits MCC contents with U-235 enrichments no greater than 4.65 wt% with only the permanently installed vertical Gd plate. Some MCC-3 packages are configured with the optional absorber plate for shipping shorter length 144 inch fuel assemblies with enrichments greater than 4.65 wt%. These packages are commonly referred to as the "double Gad plate" MCC packages.

MCC-4 packages are designed to carry the longer 168 inch XL fuel assembly type, but none are currently configured with the optional absorber plate as required to ship fuel assemblies with U-235 enrichments greater than 4.65 wt%. A shipment of XL fuel assemblies to South Texas Project (STP) with maximum enrichment of 4.80 wt% requires the installation of the optional absorber plate in an MCC-4 package under the current MCC certificate. The STP fuel assemblies are the XL with standard lattice (STD) referred to as a 17XL fuel assemblies.

As an alternative to configuring the MCC-4 with the optional absorber a 17XL fuel type specific maximum enrichment for the STD lattice in an MCC with no optional Gd plates is calculated. Because the STD lattice has a larger diameter fuel rod than the OFA lattice, which results in a lower keff, the maximum enrichment may be increased above the 4.65 wt% limit set by the 17OFA. This option would maintain the currently approved Criticality Safety Index (CSI) that is equal to 0.4, but allow U-235 enrichments greater than 4.65 wt% for 17XL contents in MCC packages with no optional Gd plates installed.

The calculations used to demonstrate safety for the MCC package are based on pre-1996 regulations that assign Fissile Class I and require a package array of 250 packages to remain subcritical when subjected the transportation accident conditions. The actual calculations for the MCC considered an infinite array for the accident transport condition; however the NRC assigned a CSI (50/N) equal to 0.4 based array size for Fissile Class I assuming 2N=250. Reducing the array size usually provides subcritical margin that allows for higher U-235 enrichment up to 5.00 wt%, but this would limit the number of packages allowed on a single conveyance to less than the 125 packages that allowed by a currently approved CSI equal to 0.4. However, this option is not effective for the MCC package because the accident conditions for transport assume a moderation condition that essentially isolates the packages from interaction in an array. The keff for a single package that is fully flooded with full density water is not significantly different from the keff for the infinite array of packages.

The results and conclusions are applicable only to the 17X17 STD type fuel lattices in an MCC package with no added absorbers, that is an MCC package with only the vertical Gadolinia absorber plates.

Results and Conclusions

The 17XL (STD) type fuel assembly enrichment in U-235 may be increased above 4.65 wt.% up to 4.85 wt.% in the MCC package without the optional Gadolinia plate. The maximum calculated keff for an infinite array of MCC packages with a 17XL type fuel assembly enriched in U-235 to 4.85 wt. % is 0.9475. The actual South Texas Project fuel assembly TGBQ at 4.85 wt.% with 7 inch 2.60 wt. % annular pellet blankets is 0.9462.

The difference in keff for an individual package and infinite package array is less than 0.005 Δkeff, and this difference is not considered significant enough to evaluate finite package arrays as an option for increasing the maximum allowed enrichment beyond 4.85 wt. % in the MCC package with no horizontal Gadolinia plates. The MCC package may be used to transport 17XL type fuel assemblies without the optional horizontal Gadolinia plate up to 4.85 wt. % enrichment in U-235, and the current criticality safety index (CSI) equal to 0.4 may still be used.

The results for the 17XL and 17OFA that are reported in the MCC license application are compared the results using the current HP hardware and operating system. There are no statistically significant differences in the calculated keff values.

Table 1 Analytical Benchmark - Comparison to evaluations in MCC license application

			MCC license application App. 6-2Table 1			Current hardware and operating system		
Assembly Type	Enrichment wt.%	Added Absorbers	Run No.	$k_{eff} \pm \sigma$	95/95 w/Bias	Run No.	$k_{eff} \pm \sigma$	95/95 w/Bias
17XL	4.65	None	Note 1	0.9322±0.00104	0.9433	1	0.9308±0.0010	0.9396
	5.00	Optional Gd Plates	Note 1	0.9223±0.00105	0.9334	2	0.9224±0.0011	0.9313
17OFA	4.65	None	Note 1	0.9382±0.00103	0.9494	3	0.9385±0.0010	0.9473
	5.00	Optional Gd Plates	Note 1	0.9335±0.00103	0.9447	4	0.9344±0.0011	0.9433

The 17XL with no added absorbers, "single Gd plate", is evaluated at 4.85 wt.% and 5.00 wt.% and the results summarized in Table 2 and Figure 1.

Table 2 - Evaluation with no added absorbers for enrichment in U-235 4.65 to 5.00 wt. %

			Individual package			Infinite package array		
Assembly Type	Enrichment wt.%	Added Absorbers	Run No.	$k_{eff} \pm \sigma$	95/95 w/Bias	Run No.	$k_{eff} \pm \sigma$	95/95 w/Bias
17XL	4.65	None	5	0.9255±0.0011	0.9344	1	0.9308±0.0010	0.9396
	4.85	None	6	0.9339±0.0010	0.9427	8	0.9387±0.0010	0.9475
	5.00	None	7	0.9365±0.0011	0.9454	9	0.9445±0.0010	0.9533
	TGBQ	None				10	0.9308±0.0010	0.9396

TGBQ - South Texas Project TGBQ 4.65 wt% with 2.65 wt% annular blanket.

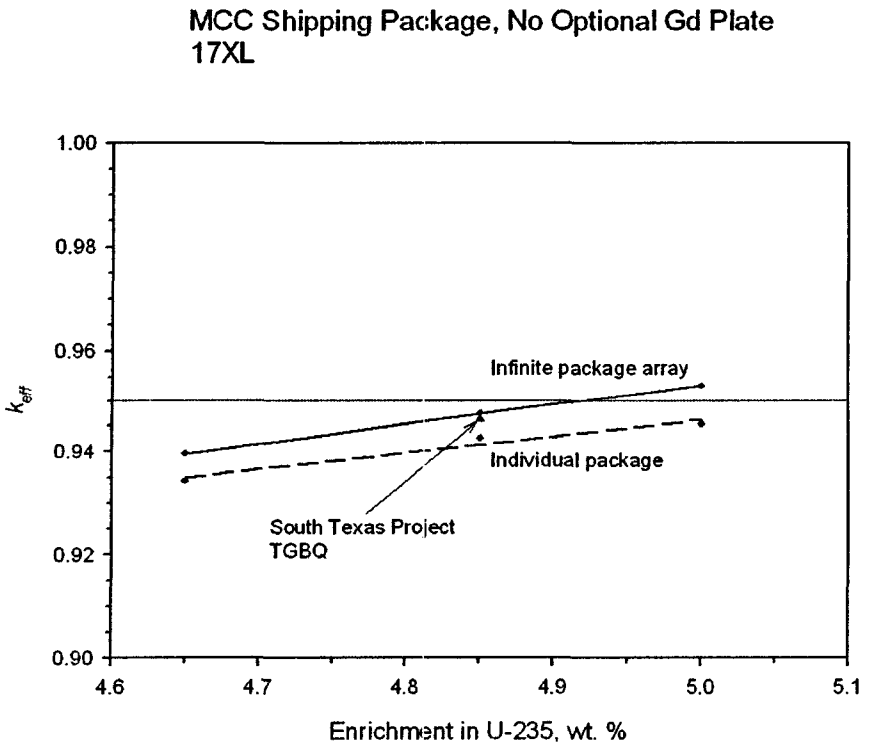

Figure 1 Evaluation with no added absorbers for enrichment in U-235 4.65 to 5.00 wt. %

Enclosure 2– Pages affected in License Application

The following pages are submitted as Revision 11 to the Application for Approval for the MCC Shipping Containers, Docket 71-9239

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Chapter 6: Criticality Evaluation

Page No. 6.3
Page No. 6.18

Appendix 6-2 Evaluation of the Nuclear Criticality Safety of Packaged Fuel Assemblies

Page No. 6-2.4 - 6-2.5
Page No. 6-2.119 – 6-2.120

CHAPTER	REVISION	EFFECTIVE DATE
TOC	10	2/15/02
1	10	2/15/02
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7	10	2/15/02
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APPENDIX	REVISION	EFFECTIVE DATE
1-1	10	2/15/02
1-2	10	2/15/02
1-3	10	2/15/02
1-4	10	2/15/02
1-5	10	2/15/02
1-6	10	2/15/02
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2-4.5	10	2/15/02
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6-1	10	2/15/02
6-2		
Page No. 6-2.1 - 6-2.4	10	2/15/02
Page No. 6-2.5 - 6-2.6	11	12/28/05
Page No. 6-2.7 - 6-2.118	10	2/15/02
Page No. 6-2.119 - 6-2.120	11	12/28/05
Page No. 6-2.121 - 6-2.126	10	2/15/02

For Type B assemblies, the 17x17 OFA is used exclusively for the contained calculations since this assembly was shown to be more reactive than the other Type B designs. As with Type A assemblies, Type B assemblies can also be shipped without the use of additional neutron absorbers provided the enrichments are restricted to 4.65 wt% or less. For Type B assemblies with enrichments greater than 4.65 wt%, additional neutron absorbers are required with the exception of 17X17 STD or 17X17XL that require additional neutron absorbers with enrichments greater than 4.85 wt%. Any of the following types and numbers of absorbers have been shown to be acceptable:

1) Assembly IFBA Rods: A minimum of 32 nominally (1X) loaded fuel rods are required in each assembly, each with a minimum coating length of 108 inches. For increased IFBA loadings (1.5X, 2X, etc.), the number of loaded fuel rods required can be reduced by the ratio of the increased loading to the nominal loading.

2) Assembly Absorber Rods: A minimum of 4 absorber rods are required in each assembly. The rods can be Pyrex BA, WABA, or Ag-In-Cd designs with a minimum length of 108 inches. The rods must be positioned within the assemblies in a symmetric pattern about the assembly center guide tube.

3) Container Absorber Plates: A minimum of 2 additional Gadolinia coated absorber plates, having the same specifications as the permanent container absorber plate, are required. The additional plates must be positioned directly below the strongback, underneath each assembly.

For the Type C assembly, the VVER-1000 is used exclusively for the contained calculations. The Type C assembly can be shipped without the use of additional neutron absorbers provided the enrichments are restricted to 4.80 wt% or less. For the Type C assembly with an enrichment greater than 4.80 wt%, additional neutron absorbers, described below, are required. It should be noted that the MCC-5 container used for the VVER-1000 assembly has permanent absorber plates between the assemblies, just as the MCC-3 and MCC-4 containers do, and permanent absorber plates under the strongback.

Any of the following types and numbers of absorbers have been shown to be acceptable:

1) Assembly IFBA rods: A minimum of 24 nominally (1X) coated fuel rods are required in each assembly, each with a minimum coating length of 108 inches. With increased IFBA loadings (1.5X, 2X, etc.), the number of loaded fuel rods required can be reduced by the ratio of the increased loading to the nominal loading.

2) Assembly Absorber Rods: A minimum of 4 absorber rods are required in each assembly. The rods can be WABA or Ag-In-Cd designs with a minimum length of 108 inches. The rods must be positioned within the assemblies in a symmetric

TABLE 1

SUMMARY OF KENO CALCULATIONAL RESULTS

Assembly Type	Enrichment wt.%	Added Absorbers	KENO $K_{eff} \pm 1$	95/95 w/Bias
Type A[1]	5.00	None	0.90486 ± 0.00462	0.9204
Type B[2]	4.75	None	0.93449 ± 0.00426	0.9495
	5.00	32 1X IFBA	0.92820 ± 0.00495	0.9455
	5.00	4 Pyrex BA	0.92718 ± 0.00559	0.9442
	5.00	4 WABA	0.92021 ± 0.00498	0.9363
	5.00	4 Ag-In-Cd	0.92521 ± 0.00540	0.9420
	5.00	Optional Gd Plates	0.92602 ± 0.00517	0.9424
Type C[3]	4.80	None	0.92774 ± 0.00431	0.9428
	5.00	24 1X IFBA	0.91739 ± 0.00474	0.9339
	5.00	4 WABA	0.92180 ± 0.00576	0.9391
	5.00	4 Ag-In-Cd	0.90730 ± 0.00517	0.9237
	5.00	Gd Coated Guides	0.90996 ± 0.00495	0.9260
Optimum Moderation Condition				
Type A	5.00	None	0.77578 ± 0.00420	0.7907
Type B	5.00	None	0.79200 ± 0.00427	0.8070
Type C	5.00	None	0.79158 ± 0.00369	0.8057
17x17 STD[4]	5.00	None	0.80429 ± 0.00382	0.8186
Lumped Structure	5.00	None	0.87092 ± 0.00343	0.8847

[1] Type A assemblies include all 14x14 and 16x16 designs. Calculations were performed using the 14x14 OFA since this assembly type is the most reactive of the Type A assemblies.

[2] Type B assemblies include all 15x15 and 17x17 designs. Calculations were performed using the 17x17 OFA since this assembly is the most reactive of all Type B assemblies

[3] The Type C assembly is the VVER-1000 fuel assembly.

[4] The 17x17 STD assembly was used for calculation since this design has the highest uranium loading of all A and B assembly types.

Fuel Pin Gap Flooding with Annular Fuel Blankets[6]				
Full Water Density Outside the Pins				
Type A	5.00	None	0.9080 ± 0.00241	0.9207
Type B[6]	4.85	None	0.9387±0.0010	0.9475
Type B[7]	5.00	Optional Gd Plates	0.9223 ± 0.00105	0.9334
Type B[8]	4.65	None	0.9382 ± 0.00103	0.9494
Type B[7]	5.00	Optional Gd Plates	0.9335 ± 0.00103	0.9447
Partial Water Density Outside the Pins				
Type A	5.00	None	0.7482 ± 0.00140	0.7597
Type B	5.00	None	0.7697 ± 0.00165	0.7814
17STD	5.00	None	0.7796 ± 0.00161	0.7913
Tightly Packed Fuel Rods				
14x14 CE[9]	5.00	None	0.71372 ± 0.00296	0.7268

[6] Annular fuel blankets consist of nominal 8.0 inches annular fuel at top and bottom of rods.

[7] **168 Inch assembly (17x17 STD/XL) with annular pellet zone 10.25 inches top and bottom.**

[8] **144 Inch assembly (17x17 OFA) with annular pellet zone 8.0 inches top and bottom**

[9] The calculation was performed using a 19x19 array of this type of fuel rod, which was shown to be the most reactive for a tightly packed lattice.

TABLE 25
KENO INPUT DECK FOR 17STD XL
4.85 WT% ENRICHMENT
10.75-INCH ANNULAR PELLET ZONE
MCC CONTAINER WITH NO HORIZONTAL GADOLINIA PLATES

```
#job -jn mcc17xl4.65_10.75inann
#
# mcc 17std xl with 10.75-in annular no horizontal gad plates
4.85wt%#
#
ln -s /opt/wec/etc/227binlib  ftn51
ln -s /opt/wec/etc/albedos  ftn79
ln -s /opt/wec/etc/weights  ftn80
#
/EOF
title-cask with 17std assembly

read parameters
 tme=180  run=yes  plt=no
 gen=400  npg=1500 nsk=050  lib=29
 xs1=yes  nub=yes
end parameters

read start
 NST=1 XSM=0.00 XSP=21.4173
 YSM=0.00 YSP=21.4173 ZSM=0.00 ZSP=182.88
end start

read mixt  sct=2
mix= 1
' solid uo2 pellet 4.85 w/o (96.5% td, 0% dish)
      1192235   1.15848E-03
      1192238   2.24406E-02
       118016   4.71982E-02mix= 2
' h2o at 1.00 g/cc in solid pellet gap
       231001   0.066854
       238016   0.033427
mix= 3
' solid zirc fuel rod cladding
     2140302   0.043326
mix= 4
' h2o at 1.00 g/cc in blanket fuel annulus
       151001   0.066854
       158016   0.033427
mix= 5
' annular uo2 pellet 4.85 w/o (96.5% td)
      1192235   1.15848E-03
      1192238   2.24406E-02
       118016   4.71982E-02
mix= 6
' h2o at 1.00 g/cc in annular pellet gap
       341001   0.066854
       348016   0.033427
mix= 7
' annular zirc fuel rod cladding
     3240302   0.043326
mix= 8
' h2o at 1.00 g/cc
       31001   0.066854
       38016   0.033427
mix= 9
' carbon steel for strongback & shell
       36012   4.728898e-4
      315031   5.807008e-5
      316032   6.642906e-5
      325055   3.877064e-4
      326000   8.420119e-2
mix= 10
' gadolinia oxide absorber (0.02 gm gd2o3/cm2 @ 0.01016 cm
thickness)
       48016   9.810529e-3
      464152   1.308071e-5
      464154   1.373474e-4
      464155   9.679722e-4
      464156   1.347313e-3
      464157   1.026835e-3
      464158   1.622008e-3
      464160   1.425792e-3
mix= 11
' carbon steel sheet for gd absorber
       56012   4.728898e-4
      515031   5.807008e-5
      516032   6.642906e-5
      525055   3.877064e-4
      526000   8.420119e-2
end mixt

read geometry
unit 1
com=" 17std fuel rod - enriched region"
cylinder  1 1   0.40960  186.055 0.0
cylinder  2 1   0.41780  186.055 0.0
cylinder  3 1   0.47500  186.055 0.0
cuboid    8 1 4p0.62992  186.055 0.0
unit 2
com=" 17std guide and instrument tube - enriched region"
cylinder  8 1   0.57150  186.055 0.0
cylinder  3 1   0.61214  186.055 0.0
cuboid    8 1 4p0.62992  186.055 0.0
unit 3
com=" 17std fuel rod - blanket region"
cylinder  4 1   0.19685   27.305 0.0
cylinder  5 1   0.40960   27.305 0.0
cylinder  6 1   0.41780   27.305 0.0
cylinder  7 1   0.47500   27.305 0.0
cuboid    8 1 4p0.62992   27.305 0.0
unit 4
com=" 17std guide and instrument tube - blanket region"
cylinder  8 1   0.57150   27.305 0.0
cylinder  3 1   0.61214   27.305 0.0
cuboid    8 1 4p0.62992   27.305 0.0
unit 7    com='strong back, horizontal'
 cuboid   9 1 25.413 0.0  0.4572  0.0  230.56  0.0
unit 8    com='strong back, vertical'
 cuboid   9 1 0.4572 0.0  24.14   0.0  230.56  0.0
unit 9    com='verticle gad poison plat between assembly'
 cuboid  11 1 0.0889 0.0  18.415  0.0  230.56  0.0
 cuboid  10 1 .09906 -.01016 18.415 0.0 230.56  0.0
unit 10   com='rest of strongback and cradle'
 cuboid   8 1 7.1051 0.5149 12.1851 0.5149 230.56  0.0
 cuboid   9 1 7.62   0.0    12.70   0.0    230.56  0.0
unit 11   com='container flanges and bracket'
 cuboid   9 1 1.285  0.0    22.86   0.0    230.56  0.0
unit 12   com='skid angle'
 cuboid   8 1 7.62   0.9652 7.62    0.9652 230.56  0.0
```

```
 cuboid  9 1 7.62  0.0   7.62   0.0   230.56 0.0
unit 13   com='middle top clamping assembly'
 cuboid  9 1 33.02 0.0   5.08   0.0  2.5908 0.0
unit 14   com='middle side clamping assembly'
 cuboid  9 1  5.08 0.0   24.120  0.0  2.5908 0.0
unit 15   com='unistrut channel assembly'
 cuboid  8 1 1.799 0.0   3.556  0.7399 230.56 0.0
 cuboid  9 1 2.538 0.0   3.556  0.0   230.56 0.0
unit 16   com='top clamping assembly'
 cuboid  9 1 33.02 0.0   5.08   0.0  5.1816 0.0
unit 17   com='side clamping assembly'
 cuboid  9 1  5.08 0.0   24.120  0.0  5.1816 0.0
unit 18   com='horizontal gad poison plate below assembly, space
3,4,5,6'
 cuboid  11 1 22.225 0.0 0.0889  0.0  21.59 0.0
 cuboid  10 1 22.225 0.0 .09906 -.01016 21.59 0.0
unit 19   com='horizontal gad poison plate below assembly, space
2 and 7'
 cuboid  11 1 22.225 0.0 0.0889  0.0  53.34 0.0
 cuboid  10 1 22.225 0.0 .09906 -.01016 53.34 0.0
unit 20   com='horizontal gad poison plate below assembly, space
1 and 8'
 cuboid  11 1 22.225 0.0 0.0889  0.0  57.33 0.0
 cuboid  10 1 22.225 0.0 .09906 -.01016 57.33 0.0
global
unit 21
com=" 17std assembly in cask "
array 1  0.0     0.0     0.0
cuboid    8 1   43.026  -3.1   31.586   -38.56   232.29  0.0

hole      7 -0.4572 -0.4572  0.0
hole      8 -0.4572  0       0.0
hole      9 -0.8979  0.8128  0.0
hole     10 24.958   -18.237  0.0
hole     11 41.74    -12.7    0.0
hole     12 30.48    -38.55   0.0
hole     13 -1.443    26.50   0.0
hole     14 26.50     2.367   0.0
hole     16 -1.443    26.50   63.93
hole     17 26.50     2.367   63.93
hole     16 -1.443    26.50   130.5
hole     17 26.50     2.367   130.5
hole     16 -1.443    26.50   177.7
hole     17 26.50     2.367   177.7
hole     16 -1.443    26.50   224.9
hole     17 26.50     2.367   224.9
hole     15 -2.997    20.87   0.0
cuboid    9 1   43.25   -3.1   31.81   -38.78   232.51  0.0
end geom

read array
ara=1 nux=17 nuy=17 nuz=2 com=" 17std assembly "
loop
 1  1 17  1    1 17  1    1  1  1
 2  3 15  3    6 12  3    1  1  1
 2  4 14 10    4 14 10     1  1  1
 2  6 12  3    3 15 12     1  1  1
 3  1 17  1    1 17  1    2  2  1
 4  3 15  3    6 12  3    2  2  1
 4  4 14 10    4 14 10     2  2  1
 4  6 12  3    3 15 12     2  2  1
end loop
end array

read bounds
all=specular
end bounds

read plot
 ttl='box slice through cask'
 pic=box
 nch='0ugiugiabcdefhjklmnop.'
 xul= -4.0    yul= 30.1    zul= 66.52
 xlr= 45.0    ylr= -40.0   zlr= 66.52
 uax=1.0   vdn=-1.0  nax=130 end
 ttl='box slice through cask'
 pic=mat
 nch='0u.z.u.z.sgs'
 xul= -4.0    yul= 30.1    zul= 66.52
 xlr= 45.0    ylr= -40.0   zlr= 66.52
 uax=1.0   vdn=-1.0  nax=130 end
 ttl='box slice through assembly'
 pic=box
 nch='0ugiugiabcdefhjklmnop.'
 xul= 0.0     yul= 20.0    zul= 66.52
 xlr= 20.0    ylr= 0.0   zlr= 66.52
 uax=1.0   vdn=-1.0  nax=130 end
 ttl='mat slice through annular pellet'
 pic=mat
 nch='0u.z.u.z.sgs'
 xul= 1.41    yul= 4.24   zul= 180.0
 xlr= 4.24    ylr= 1.41   zlr= 180.0
 uax=1.0   vdn=-1.0  nax=130 end
 ttl='mat slice through annular pellet'
 pic=mat
 nch='0u.z.u.z.sgs'
 xul= -1.0    yul= 18.0   zul= 180.0
 xlr= -0.5    ylr= 0.0    zlr= 180.0
 uax=1.0   vdn=-1.0  nax=130 ndn=100 end
end plot
end data
end
```

The Hypothetical Accident Condition evaluations were performed assuming infinite array geometry, therefore these results bound the infinite array Normal Condition of Transport calculations.

For the MCC shipping container using permanent Gd_2O_3 absorber plates, under infinite array Hypothetical Accident Conditions, it has been calculated that the final K_{eff} with bias and uncertainties at the 95% confidence level is less than 0.95 for the following conditions:

1) Type A fuel assemblies (14x14 and 16x16 designs) with maximum enrichments up to 5.0 wt%; or,

2) Type B fuel assemblies (15x15 and 17x17 designs) with maximum enrichments up to 4.65 wt%; or,

3) Type B fuel assemblies (15x15 and 17x17 designs) with maximum enrichments above 4.65 wt% with exception of 17X17 XL or 17X17 STD designs with maximum enrichments above 4.85 wt%, up to 5.0 wt%, using one of the following additional absorber options:
   a) Assembly IFBA Rods: A minimum of 32 nominally (1X) loaded fuel rods in each assembly, each with a minimum coating length of 108 inches. For increased IFBA loadings (1.5X, 2X, etc.), the number of loaded fuel rods required can be reduced by the ratio of the increased loading to the nominal loading.

   b) Assembly Absorber Rods: A minimum of 4 absorber rods in each assembly. The rods can be Pyrex BA, WABA, or Ag-In-Cd designs with a minimum length of 108 inches. The rods must be positioned within the assemblies in a symmetric pattern about the assembly center guide tube.

   c) Container Absorber Plates: A minimum of 2 additional Gadolinia coated absorber plates, having the same specifications as the permanent container absorber plates, are required. The additional plates must be positioned directly on the strongback (top or bottom), underneath each assembly.

4) The Type C fuel assembly (VVER-1000) with maximum enrichments up to 4.8 wt%; or,

5) The Type C fuel assembly (VVER-1000) with maximum enrichments above 4.8 wt%, up to 5.0 wt%, using one of the following additional absorber options:
   a) Assembly IFBA rods: A minimum of 24 nominally (1X) coated fuel rods are required in each assembly, each with a minimum coating length of 108 inches. With increased IFBA loadings (1.X, 2X, etc.), the number of

Submittal Date	Reason	NRC Certificate	DOT Certificate (Corresponding NRC CoC)
15 FEB 02	License Renewal. All sections set to Revision 10 Revised Appendix 1-6 to include technical justification contained in Mar 24, 1997 submittal.	Rev 12	Rev 13 Rev 14
28 DEC 05	Revised Chapter 6 and Appendix 6-2 to allow higher maximum enrichment for 17X17STD or 17X17XL contents in MCC3 or MCC4 with no horizontal Gd_2O_3 plate.	Rev. 13	Rev 15

Enclosure 3: Proposed wording for Certificate of Compliance USA/9239/AF

Modify Paragraph 6 the Certificate of Compliance for package identification number USA/9239/AF to allow the 17X17 STANDARD lattice fuel assemblies (17X17 STD and 17X17XL) contents to be shipped in an MCC-3 or MCC-4 without the optional horizontal Gadolinia plate installed for enrichments up to and including 4.85 wt%.

Paragraph 6 in Revision 12 should be changed from,

6. For shipments of 14x14, 15x15, 16x16, and 17x17 fuel assemblies with U-235 enrichments of over 4.65 and up to 5.0 wt%, horizontal Gd2O3 neutron absorber plates shall be positioned underneath each assembly. The horizontal absorber plates shall be placed horizontally on the underside of the strongback, as specified in the respective drawing in Condition 5(a) for the MCC-3 and MCC-4 models.

to include the requested allowance for the 17X17STD and 17X17XL in Revision 13

6. (a) For shipments of 14x14, 15x15, 16x16, and 17x17 fuel assemblies with U-235 enrichments of over 4.65 and up to 5.0 wt%, horizontal Gd2O3 neutron absorber plates shall be positioned underneath each assembly. The horizontal absorber plates shall be placed horizontally on the underside of the strongback, as specified in the respective drawing in Condition 5(a) for the MCC-3 and MCC-4 models.

   (b) For shipments of 17x17 STANDARD lattice fuel assemblies (17X17STD and 17X17XL) with U-235 enrichments of over 4.85 and up to 5.0 wt%, horizontal Gd2O3 neutron absorber plates shall be positioned underneath each assembly. The horizontal absorber plates shall be placed horizontally on the underside of the strongback, as specified in the respective drawing in Condition 5(a) for the MCC-3 and MCC-4 models.

Enclosure 4: Previous Version of Certificate of Compliance USA/9239/AF including NRC SER

NRC FORM 618 (8-2000) 10 CFR 71	U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES

1. a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE		PAGES
9239	12	71-9239	USA/9239/AF	1	OF	4

2. PREAMBLE

a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."

b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO *(Name and Address)*

Westinghouse Electric Company
LLC (WELCO)
P.O. Box 355
Pittsburgh, PA 15230

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

Westinghouse Electric Corporation application dated February 14, 2002, as supplemented.

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model Nos.: MCC-3, MCC-4, and MCC-5

(2) Description

The MCC packages are shipping containers for unirradiated uranium oxide fuel assemblies. The packagings consist of a steel fuel element cradle assembly equipped with a strongback and an adjustable fuel element clamping assembly. The cradle assembly is shock mounted to a 13-gauge carbon steel outer container by shear mounts. The MCC-3 container is closed with thirty ½-inch T-bolts. The MCC-4 and MCC-5 containers are closed with fifty ½-inch T-bolts.

The MCC-3 and MCC-4 containers are permanently equipped with vertical Gd_2O_3 neutron absorber plates that are mounted on the center wall of the strongback. Additional horizontal Gd_2O_3 neutron absorber plates, mounted on the underside of the strongback, are required for the contents as specified.

The MCC-5 container is permanently equipped with both the vertical and horizontal Gd_2O_3 neutron absorber plates. Additional vee-shaped, guided Gd_2O_3 neutron absorber plates are required for the contents as specified.

Approximate dimensions of the MCC-3 packaging are 44-1/2 inches O.D. by 194-1/2 inches long. The gross weight of the packaging and contents is 7,544 pounds. The maximum weight of the contents is 3,300 pounds.

Approximate dimensions of the MCC-4 packaging are 44-1/2 inches O.D. by 226 inches long. The gross weight of the packaging and contents is 10,533 pounds. The maximum weight of the contents is 3,870 pounds.

5. (a) Packaging (continued)

Approximate dimensions of the MCC-5 packaging are 44-1/2 inches O.D. by 226 inches long. The gross weight of the packaging and contents is 10,533 pounds. The maximum weight of the contents is 3,700 pounds.

(3) Drawings

The MCC-3 packaging is constructed in accordance with Westinghouse Electric Corporation Drawing No. MCCL301, Sheets 1, 2, 3, and 4, Rev. 6. I

The MCC-4 packaging is constructed in accordance with Westinghouse Electric Corporation Drawing No. MCCL401, Sheets 1, 2, 3, 4, and 5, Rev. 9. I

The MCC-5 packaging is constructed in accordance with Westinghouse Electric Corporation Drawing No. MCCL501, Sheets 1 through 10, Rev. 6.

(b) Contents

(1) Type and form of material

Unirradiated PWR uranium dioxide fuel assemblies with a maximum uranium-235 enrichment of 5.0 weight percent.

The fuel assemblies shall meet the specifications given in Westinghouse Drawing No. 6481E15, Rev. 3, and in the following tables of Appendix 1-4 of the application, as supplemented:

Table 1-4.1, Rev. 10	Fuel Assembly Parameters 14x14 Type Fuel Assemblies	I
Table 1-4.2, Rev. 10	Fuel Assembly Parameters 15x15 Type Fuel Assemblies	I
Table 1-4.3, Rev. 10	Fuel Assembly Parameters 16x16 Type Fuel Assemblies*	I
Table 1-4.4, Rev. 10	Fuel Assembly Parameters 17x17 Type Fuel Assemblies*	I
Table 1-4.5, Rev. 10	Fuel Assembly Parameters VVER-1000 Type Fuel Assembly**	I

* 16x16 CE fuel assemblies and the 17x17 W-STD/XL fuel assemblies may be shipped only in the Model No. MCC-4 package.

** VVER-1000 fuel assemblies may be shipped only in the Model No. MCC-5 package.

5. (b) Contents (continued)

(2) Maximum quantity of material per package

Two (2) fuel assemblies

(c) Transport Index for Criticality Control (Criticality Safety Index)

Minimum transport index to be shown on label for nuclear criticality control: 0.4

6. For shipments of 14x14, 15x15, 16x16, and 17x17 fuel assemblies with U-235 enrichments of over 4.65 wt% and up to 5.0 wt%, horizontal Gd_2O_3 neutron absorber plates shall be positioned underneath each assembly. The horizontal absorber plates shall be placed horizontally on the underside of the strongback, as specified in the respective drawings in Condition 5(a)(3) for the MCC-3 and MCC-4 models.

7. For shipments of VVER-1000 fuel assemblies with U-235 enrichments of over 4.80 wt% and up to 5.0 wt%, a guided Gd_2O_3 neutron absorber plate shall be positioned underneath each assembly. The guided absorber plates shall be placed horizontally on the topside of the strongback, as specified in the drawings in Condition 5(a)(3) for the MCC-5 model.

8. Each fuel assembly must be unsheathed or must be enclosed in an unsealed plastic sheath which may not extend beyond the ends of the fuel assembly. The ends of the sheath may not be folded or taped in any manner that would prevent flow of liquids into or out of the sheathed fuel assembly.

9. The dimensions, minimum Gd_2O_3 loading and coating specifications, and acceptance testing of the neutron absorber plates shall be in accordance with the "Gd_2O_3 Neutron Absorber Plates Specifications," Appendix 1-6, Rev. 10, of the application, as supplemented. The minimum Gd_2O_3 coating areal density on the vertical and horizontal neutron absorber plates shall be 0.054 g-Gd_2O_3/cm^2. The minimum Gd_2O_3 coating areal density on guided neutron absorber plates shall be 0.027 g-Gd_2O_3/cm^2.

10. In addition to the requirements of Subpart G of 10 CFR Part 71:

(a) Each package shall be prepared for shipment and operated in accordance with the "Routine Shipping Container Utilization Summary Operating Procedures," in Chapter 7 of the application, as supplemented; and

(b) Each package shall be tested and maintained in accordance with the "Acceptance Tests, Maintenance Program, and Recertification Program," in Chapter 8 of the application, as supplemented, and as specified in the respective drawings in Condition 5(a)(3) for the MCC-3, MCC-4, and MCC-5 models.

11. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.12.

12. Expiration date: March 31, 2007.

NRC FORM 618 (8-2000) 10 CFR 71	CERTIFICATE OF COMPLIANCE FOR RADIOACTIVE MATERIAL PACKAGES		U.S. NUCLEAR REGULATORY COMMISSION	
1. a CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE / PAGES
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REFERENCES

Westinghouse Electric Corporation application dated February 14, 2002. I

Supplements dated: March 6, 2002. I

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

E. William Brach, Director
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Date: March 14, 2002

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION REPORT

Docket No. 71-9239
Model Nos. MCC-3, MCC-4, and MCC-5 Packages
Certificate of Compliance No. 9239
Revision No. 12

SUMMARY

By letter dated October 19, 2001, as supplemented November 16, 2001, February 14, 2002, and March 6, 2002, Westinghouse Electric Company (Westinghouse) requested amendment and renewal of Certificate of Compliance No. 9239 for the Model Nos. MCC-3, MCC-4, and MCC-5 packages. Westinghouse also provided a consolidated application as required in 10 CFR 71.38(c). Based on the statements and representations contained in the application, the staff agrees that the changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71. The Certificate of Compliance has been amended and renewed for a five year term.

DRAWING CHANGES

Westinghouse submitted revised drawings numbers MCCL301, Sheets 1-4, Rev. 6 and MCCL401, Sheets 1-5, Rev. 9, for the MCC-3 and MCC-4 packages, respectively. Westinghouse stated the drawings were administratively revised to clearly identify safety-related components on the license drawings. The drawings identified 10 additional components for the MCC-3 package and 6 additional components for the MCC-4 package. Westinghouse also stated that these changes were consistent with similar drawing changes for the MCC-5 package, that was previously approved by NRC in Revision 11 of the Certificate of Compliance.

The staff reviewed the revised drawings and found them to be acceptable. The proposed changes will not affect the ability of the package to meet the requirements of 10 CFR Part 71.

CONSOLIDATED APPLICATION

Westinghouse submitted a consolidated application as required in 10 CFR 71.38(c). The consolidated application incorporated design changes and analyses previously approved by NRC, as referenced in Revision 11 of the Certificate of Compliance. These references consisted of the previous application dated January 13, 1991, and supplements dated October 2, October 9, November 1, and November 13, 1991; January 27, March 30, May 12, and June 18, 1992; August 18, 1993; January 14, April 22, May 24, July 26, and August 2, 1994; October 1, 1996; March 24 and December 22, 1997; September 28, 1998; February 19, February 22, July 28, August 2, October 13, and December 3, 1999; and December 15, 2000.

The staff performed an administrative review of the consolidated application and found it to be acceptable.

CONCLUSION

The NRC has renewed the Certificate of Compliance for a five year period, which expires March 31, 2007. The NRC has revised Condition 5(a)(3) of the Certificate of Compliance to specify the revised drawing numbers and has revised Conditions 5(b)(1), 6, 7, 9, and 10 to reference the revised drawings and consolidated application, as appropriate. The NRC also revised Condition No. 5(c) of the Certificate of Compliance to clarify that the Transport Index for criticality control is the same as the Criticality Safety Index, as defined in the International Atomic Energy Agency Regulations for the Safe Transport of Radioactive Material (TS-R-1).

Issued with Certificate of Compliance No. 9239, Revision No. 12, on March 14, 2002.