

February 2, 2017

U.S. Nuclear Regulatory Commission
11555 Rockville Pike
Rockville, MD, 20852-2738

Attn: Document Control Desk

Subject: Submission of Replacement Pages for MAGNATRAN Transportation
Package, SAR Revision 16B

Docket No. 71-9356

- Reference:
1. ED20120129, Submission of an Application for the NRC Certificate of Compliance (CoC) for the NAC MAGNATRAN Transport Cask, NAC International, November 26, 2012
 2. Safety Analysis Report for the MAGNATRAN Transport Cask, Revision 12A, NAC International, October 2012
 3. ED20130024, Submission of NAC Proprietary Supporting Information for NAC's Application for a NRC Certificate of Compliance (CoC) for the NAC MAGNATRAN Transport Cask, February 15, 2013
 4. NRC Letter, Application for the Model No. MAGNATRAN Transport Package – Accepted for Review (TAC No. L24701), February 28, 2013
 5. ED20130037, Submission of NAC Responses to NRC's Initial Non-Proprietary Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, March 29, 2013
 6. NRC Letter, Application for the Model No. MAGNATRAN Transportation Package – Request for Additional Information, September 10, 2013
 7. ED20140122, Submission of NAC Responses to NRC's Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, December 1, 2014

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8. ED20150002, Submission of Supporting Information for NAC's Responses to the NRC's Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transport Package, January 13, 2015
9. ED20150006, Submission of Supporting Information (METAMIC Metal Matrix Composites) for NAC's Responses to the NRC's Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transport Package, January 21, 2015
10. NRC Letter, Application for the Model No. MAGNATRAN Transportation Package – Request for Additional Information, June 2, 2015
11. NRC Letter, Application for the Model No. MAGNATRAN Transportation Package – Staggered Second Request for Additional Information, June 26, 2015
12. ED20150117, Submission of NAC Responses to NRC's Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, October 15, 2015
13. NRC Letter, Application for the Model No. MAGNATRAN Transportation Package –Third Request for Additional Information, March 3, 2016
14. ED20160036, Submission of NAC Responses to NRC's Third Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, May 9, 2016
15. NRC Letter, Application for the Model No. MAGNATRAN Transportation Package – Fourth Request for Additional Information, September 19, 2016
16. ED20160129, Submission of NAC Responses to NRC's Fourth Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, January 11, 2017

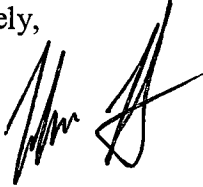
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17. ED20170003, Submission of Supporting Calculations for Responses to the NRC's Fourth Request for Additional Information to NAC's Request for Certificate of Compliance (CoC) No. 9356 for the MAGNATRAN Transportation Package, January 13, 2017

NAC International (NAC), herewith, submits replacement pages to SAR Revision 16B (Reference 16). SAR Revision 16B in part introduced Section 5.8.14, with cool time tables for a maximum heat load of 22kW. The loading tables in this section (Tables 5.8-59 and 5.8-60) contained a typographical error in the column headings for the "Assembly Average Burnup" fuel type. The tables in Reference 16 contained two columns for CE 14X14, which should have been a column for CE 14X14 and WE 14X14. This error only affected the column heading and not the data within the table. The replacement pages are provided in Attachment 1 to this letter.

If there are any questions and/or comments regarding the herewith submitted information, please contact me on my direct line at 678-328-1236.

Sincerely,



Wren Fowler
Director, Licensing
Engineering

Attachments:

Attachment 1 – MAGNATRAN, SAR 16B Replacement Pages

Attachment 1

MAGNATRAN, SAR 16B Replacement Pages

5.8.14 22 kW PWR Cool Time Tables

PWR cool time tables are calculated for the MAGNATRAN system with a maximum heat load of 22 kW. Dose rates are not recalculated for the 22 kW heat load. All previously calculated dose rates at 23 kW are bounding. For any fuel type, burnup, initial enrichment, and cool time combination allowed at the 23 kW cask heat load (622 W/assembly), additional cool time, and therefore reduced sources, are associated with the reduction to a 22 kW cask heat load (595 W/assembly). Bounding maximum dose rates are therefore documented in Section 5.8.3.

Minimum cool times for cask heat loads of 22 kW or less are documented in Table 5.8-58 and Table 5.8-59. For casks with average assembly enrichment less than 2.1 wt % ^{235}U and a burnup less than 30 GWd/MTU, the cool times in table 5.8-58 shall be used. Fuel assembly minimum cool times for assemblies with greater than or equal to 2.1 wt% ^{235}U initial average enrichment and assembly average burnup up to 45 GWd/MTU are found in Table 5.8-59. Table 5.8-60 presents minimum cool time for fuel with assembly average burnup greater than 45 GWd/MTU. The cool times in Table 5.8-60, include a reduction in allowable heat load for fuel over 45 GWd/MTU (20.9 kW/cask).

The additional cool time required to load non-fuel hardware is shown in Table 5.8-61.

The requirements for loading damaged fuel and reconstituted fuel assemblies do not change.

Table 5.8-58 Low Burnup PWR Fuel Loading Table – 22 kW/Cask

Max. Assembly Avg. Burnup [MWd/MTU]	Min. Assembly Avg. Initial Enrichment [wt% ^{235}U]	Minimum Cool Time [Years]
10,000	1.3	4.0
15,000	1.5	4.0
20,000	1.7	4.5
25,000	1.9	5.7
30,000	2.1	7.4

Table 5.8-59 Loading Table for PWR Fuel (22 kW/Cask)

Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	Assembly Average Burnup ≤ 30 GWd/MTU Minimum Cooling Time (years)						
	CE	WE	WE	B&W	CE	WE	B&W
	14X14	14X14	15x15	15x15	16X16	17X17	17X17
2.1 ≤ E < 2.3	6.0	6.1	7.1	7.4	6.6	7.2	7.2
2.3 ≤ E < 2.5	5.9	6.0	7.0	7.3	6.6	7.0	7.1
2.5 ≤ E < 2.7	5.9	6.0	7.0	7.2	6.5	7.0	7.0
2.7 ≤ E < 2.9	5.8	5.9	6.9	7.2	6.4	6.9	6.9
2.9 ≤ E < 3.1	5.8	5.9	6.8	7.1	6.4	6.9	6.9
3.1 ≤ E < 3.3	5.7	5.8	6.8	7.0	6.3	6.9	6.9
3.3 ≤ E < 3.5	5.7	5.8	6.8	7.0	6.3	6.8	6.8
3.5 ≤ E < 3.7	5.6	5.7	6.7	7.0	6.2	6.8	6.8
3.7 ≤ E < 3.9	5.6	5.7	6.7	6.9	6.2	6.7	6.7
3.9 ≤ E < 4.1	5.6	5.7	6.6	6.9	6.1	6.7	6.7
4.1 ≤ E < 4.3	5.5	5.6	6.6	6.9	6.1	6.7	6.7
4.3 ≤ E < 4.5	5.5	5.6	6.6	6.8	6.0	6.6	6.6
4.5 ≤ E < 4.7	5.5	5.6	6.5	6.8	6.0	6.6	6.6
4.7 ≤ E < 4.9	5.4	5.6	6.5	6.8	6.0	6.6	6.6
E ≥ 4.9	5.4	5.5	6.5	6.7	6.0	6.6	6.6
Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	30 < Assembly Average Burnup ≤ 35 GWd/MTU Minimum Cooling Time (years)						
	CE	WE	WE	B&W	CE	WE	B&W
	14X14	14X14	15x15	15x15	16X16	17X17	17X17
2.1 ≤ E < 2.3	-	-	10.1	-	-	-	-
2.3 ≤ E < 2.5	7.7	7.9	9.9	10.7	8.8	10.0	10.0
2.5 ≤ E < 2.7	7.5	7.8	9.8	10.6	8.7	9.9	9.9
2.7 ≤ E < 2.9	7.4	7.7	9.7	10.4	8.6	9.7	9.7
2.9 ≤ E < 3.1	7.3	7.6	9.5	10.2	8.5	9.6	9.6
3.1 ≤ E < 3.3	7.2	7.5	9.4	10.1	8.4	9.5	9.5
3.3 ≤ E < 3.5	7.2	7.4	9.3	10.0	8.3	9.4	9.4
3.5 ≤ E < 3.7	7.1	7.4	9.2	9.9	8.2	9.3	9.3
3.7 ≤ E < 3.9	7.0	7.3	9.1	9.8	8.1	9.3	9.2
3.9 ≤ E < 4.1	7.0	7.2	9.1	9.7	8.1	9.1	9.2
4.1 ≤ E < 4.3	6.9	7.2	9.0	9.6	8.0	9.1	9.1
4.3 ≤ E < 4.5	6.9	7.1	9.0	9.6	8.0	9.0	9.0
4.5 ≤ E < 4.7	6.9	7.0	8.9	9.5	7.9	9.0	9.0
4.7 ≤ E < 4.9	6.8	7.0	8.8	9.5	7.9	9.0	9.0
E ≥ 4.9	6.8	7.0	8.8	9.4	7.9	8.9	8.9

Table 5.8-59 Loading Table for PWR Fuel (22 kW/Cask) (continued)

Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	35 < Assembly Average Burnup ≤ 40 GWd/MTU						
	Minimum Cooling Time (years)						
	CE 14X14	WE 14X14	WE 15x15	B&W 15x15	CE 16X16	WE 17X17	B&W 17X17
2.1 ≤ E < 2.3	-	-	-	-	-	-	-
2.3 ≤ E < 2.5	-	-	-	-	-	-	-
2.5 ≤ E < 2.7	10.7	11.9	15.2	16.6	13.1	15.4	15.4
2.7 ≤ E < 2.9	10.5	11.2	14.9	16.2	12.9	15.2	15.1
2.9 ≤ E < 3.1	10.3	11.0	14.7	16.0	12.6	14.8	14.8
3.1 ≤ E < 3.3	10.1	10.8	14.4	15.8	12.4	14.7	14.7
3.3 ≤ E < 3.5	9.9	10.6	14.2	15.6	12.2	14.4	14.5
3.5 ≤ E < 3.7	9.8	10.4	14.1	15.4	12.0	14.3	14.2
3.7 ≤ E < 3.9	9.7	10.3	13.9	15.3	11.9	14.2	14.1
3.9 ≤ E < 4.1	9.6	10.1	13.7	15.1	11.8	14.0	14.0
4.1 ≤ E < 4.3	9.5	10.0	13.6	15.0	11.7	13.9	13.9
4.3 ≤ E < 4.5	9.4	10.0	13.5	14.8	11.6	13.7	13.8
4.5 ≤ E < 4.7	9.3	9.9	13.5	14.8	11.6	13.7	13.6
4.7 ≤ E < 4.9	9.2	9.8	13.3	14.6	11.5	13.6	13.6
E ≥ 4.9	9.2	9.7	13.3	14.5	11.5	13.5	13.5
Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	40 < Assembly Average Burnup ≤ 45 GWd/MTU						
	Minimum Cooling Time (years)						
	CE 14X14	WE 14X14	WE 15x15	B&W 15x15	CE 16X16	WE 17X17	B&W 17X17
2.1 ≤ E < 2.3	-	-	-	-	-	-	-
2.3 ≤ E < 2.5	-	-	-	-	-	-	-
2.5 ≤ E < 2.7	-	-	-	-	-	-	-
2.7 ≤ E < 2.9	15.7	19.0	21.7	23.5	19.2	22.1	22.1
2.9 ≤ E < 3.1	15.3	16.7	21.4	23.2	18.8	21.8	21.8
3.1 ≤ E < 3.3	15.0	16.2	21.1	22.9	18.6	21.5	21.5
3.3 ≤ E < 3.5	14.8	15.9	20.9	22.6	18.3	21.3	21.3
3.5 ≤ E < 3.7	14.5	15.7	20.7	22.4	18.0	21.1	21.0
3.7 ≤ E < 3.9	14.2	15.5	20.4	22.2	17.8	20.8	20.8
3.9 ≤ E < 4.1	14.0	15.3	20.2	22.0	17.6	20.6	20.6
4.1 ≤ E < 4.3	13.9	15.0	20.0	21.8	17.5	20.5	20.4
4.3 ≤ E < 4.5	13.7	14.8	19.8	21.6	17.3	20.3	20.3
4.5 ≤ E < 4.7	13.6	14.7	19.7	21.5	17.1	20.1	20.1
4.7 ≤ E < 4.9	13.5	14.5	19.6	21.3	17.0	20.0	19.9
E ≥ 4.9	13.4	14.4	19.5	21.2	16.9	19.8	19.9

Table 5.8-60 Loading Table for PWR Fuel (20.9 kW/Cask)

Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	45 < Assembly Average Burnup ≤ 50 GWd/MTU						
	Minimum Cooling Time (years)						
	CE 14X14	WE 14X14	WE 15x15	B&W 15x15	CE 16X16	WE 17X17	B&W 17X17
2.1 ≤ E < 2.3	-	-	-	-	-	-	-
2.3 ≤ E < 2.5	-	-	-	-	-	-	-
2.5 ≤ E < 2.7	-	-	-	-	-	-	-
2.7 ≤ E < 2.9	-	-	31.0	-	-	-	-
2.9 ≤ E < 3.1	23.8	25.2	30.7	32.7	27.8	31.3	31.2
3.1 ≤ E < 3.3	23.5	24.7	30.5	32.5	27.6	31.0	31.0
3.3 ≤ E < 3.5	23.2	24.4	30.2	32.2	27.4	30.8	30.8
3.5 ≤ E < 3.7	22.9	24.1	30.0	32.1	27.1	30.6	30.5
3.7 ≤ E < 3.9	22.6	23.9	29.8	31.9	27.0	30.4	30.3
3.9 ≤ E < 4.1	22.4	23.6	29.6	31.7	26.8	30.2	30.1
4.1 ≤ E < 4.3	22.2	23.4	29.4	31.5	26.6	30.0	29.9
4.3 ≤ E < 4.5	22.0	23.2	29.3	31.3	26.4	29.9	29.8
4.5 ≤ E < 4.7	21.8	23.0	29.1	31.2	26.2	29.7	29.6
4.7 ≤ E < 4.9	21.6	22.8	28.9	31.0	26.0	29.6	29.5
E ≥ 4.9	21.4	22.7	28.7	30.8	25.8	29.4	29.3
Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	50 < Assembly Average Burnup ≤ 55 GWd/MTU						
	Minimum Cooling Time (years)						
	CE 14X14	WE 14X14	WE 15x15	B&W 15x15	CE 16X16	WE 17X17	B&W 17X17
2.1 ≤ E < 2.3	-	-	-	-	-	-	-
2.3 ≤ E < 2.5	-	-	-	-	-	-	-
2.5 ≤ E < 2.7	-	-	-	-	-	-	-
2.7 ≤ E < 2.9	-	-	-	-	-	-	-
2.9 ≤ E < 3.1	-	-	-	-	-	-	-
3.1 ≤ E < 3.3	28.9	31.7	36.1	38.1	33.8	37.3	37.2
3.3 ≤ E < 3.5	28.7	30.7	35.8	38.0	33.6	37.1	37.0
3.5 ≤ E < 3.7	28.3	30.4	35.7	37.8	33.4	36.9	36.8
3.7 ≤ E < 3.9	28.1	30.2	35.4	37.6	33.2	36.8	36.6
3.9 ≤ E < 4.1	27.9	29.9	35.2	37.4	33.0	36.6	36.5
4.1 ≤ E < 4.3	27.6	29.7	35.1	37.3	32.9	36.4	36.3
4.3 ≤ E < 4.5	27.4	29.5	34.8	37.1	32.6	36.3	36.2
4.5 ≤ E < 4.7	27.2	29.3	34.7	37.0	32.5	36.2	36.1
4.7 ≤ E < 4.9	27.1	29.1	34.6	36.8	32.3	36.0	35.9
E ≥ 4.9	26.9	28.9	34.4	36.7	32.2	35.8	35.7

Table 5.8-60 Loading Table for PWR Fuel (20.9 kW/Cask) (continued)

Minimum Initial Assembly Avg. Enrichment wt % ²³⁵ U (E)	55 < Assembly Average Burnup ≤ 60 GWd/MTU						
	Minimum Cooling Time (years)						
	CE 14X14	WE 14X14	WE 15x15	B&W 15x15	CE 16X16	WE 17X17	B&W 17X17
2.1 ≤ E < 2.3	-	-	-	-	-	-	-
2.3 ≤ E < 2.5	-	-	-	-	-	-	-
2.5 ≤ E < 2.7	-	-	-	-	-	-	-
2.7 ≤ E < 2.9	-	-	-	-	-	-	-
2.9 ≤ E < 3.1	-	-	-	-	-	-	-
3.1 ≤ E < 3.3	-	-	41.6	-	-	-	-
3.3 ≤ E < 3.5	34.1	37.6	41.4	43.7	38.5	42.2	42.1
3.5 ≤ E < 3.7	33.8	36.1	41.3	43.5	38.3	42.0	41.9
3.7 ≤ E < 3.9	33.6	35.9	41.1	43.4	38.1	41.8	41.7
3.9 ≤ E < 4.1	33.4	35.7	41.0	43.3	37.9	41.8	41.6
4.1 ≤ E < 4.3	33.2	35.5	40.8	43.1	37.8	41.6	41.5
4.3 ≤ E < 4.5	33.0	35.3	40.7	43.0	37.6	41.4	41.3
4.5 ≤ E < 4.7	32.9	35.1	40.5	42.9	37.5	41.3	41.2
4.7 ≤ E < 4.9	32.7	35.0	40.4	42.8	37.3	41.2	41.1
E ≥ 4.9	32.5	34.8	40.3	42.7	37.2	41.1	41.0

Table 5.8-61 Additional Cool Time to Load Non-Fuel Hardware
(Reduced Heat Load – 22kW PWR - Configuration)

Assembly	BPRA/HFRA*	TP	RCC	NSA
CE 14x14	-	-	0.4	0.4
WE 14x14	1.1	0.1	0.3	1.1
WE 15x15	1.5	0.2	7.6	1.5
BW 15x15	0.1	0.2	0.3	0.2
CE 16x16	-	-	0.4	0.4
WE 17x17	1.5	0.2	7.3	1.5
BW 17x17	0.1	0.2	0.3	0.2

* HFRA's limited to Westinghouse fuel assemblies only