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September 29, 2005

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

Attn:

Document Control Desk

Subject:

Responses to Request for Additional Information on the NAC MAGNASTOR

System Application

Docket No. 72-1031 (TAC No. L23764)

References:

1. MAGNASTOR System – Application for Approval, NAC International, August 31, 2004

2. Acknowledgment Review of the MAGNASTOR System Application, U.S. Nuclear Regulatory Commission (NRC), November 1, 2004

3. NRC/NAC Meeting on the MAGNASTOR System, November 1, 2004

4. Responses to Questions from November 1, 2004, NRC/NAC Meeting on the MAGNASTOR System, NAC International, January 31, 2005

5. Request for Additional Information for the Review of the NAC MAGNASTOR System Application, U.S. Nuclear Regulatory Commission (NRC), May 23, 2005

6. NRC/NAC Meeting on the MAGNASTOR System RAIs, June 8, 2005

NAC International, Inc. (NAC) herewith provides responses to the Request for Additional Information (Reference 5) for the Review of the NAC MAGNASTOR System Application (Reference 1) in which NAC requested approval of the MAGNASTOR System for the storage of spent nuclear fuel under the provisions of 10 CFR 72, Subpart L. This submittal includes four copies of the RAI comments with the NAC responses presented in the standard NAC RAI response format, four copies of the complete MAGNASTOR Safety Analysis Report (SAR), Revision 05A (all page headers), and one copy (on CD) of eight supporting NAC calculation packages and five fuel assembly description documents that are separately packaged as NAC Proprietary Information.

Consistent with NAC administrative practice, all SAR pages changed in this submittal are uniquely identified by revision bars in the page margin that mark each change on the page. A detailed list of the changes in the SAR is provided in Attachment 1. The list of effective pages has been replaced by a master table of contents to more clearly describe the contents of the SAR. Changes in the chapter table of contents, list of figures, list of tables, and in text flow are not marked with revision bars. Also, for editorial convenience: 1) figures or tables on pages listing computer run inputs/outputs do not have "continued" in the title; 2) where a new footnote is inserted, the remaining renumbered footnotes do not have revision bars; and 3) where a new operating step is inserted, the remaining renumbered steps do not have revision bars.

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Note that the appendices in Chapters 3, 4, 5, and 6 of Revision 0 of the MAGNASTOR SAR have been incorporated into the associated chapter as a separate section (no revision bars applied) so that there is only one table of contents, one list of figures and one list of tables for each chapter. This revision enhances electronic navigability throughout the chapter. Upon final approval, the SAR will be reformatted, assigned the next appropriate revision number, and issued as the NAC MAGNASTOR FSAR.

Thirteen NAC drawings have been revised and one drawing has been added in conjunction with the RAI responses. These drawings and the two drawings that were not revised are all included in Chapter 1 of the SAR. A detailed list of the drawing changes is provided in Attachment 2.

Included in this submittal are eight NAC Calculation Packages and five fuel assembly description documents that are all separately packaged and identified as proprietary information. The calculation packages and fuel documents are provided on a CD to the NRC as NAC Proprietary Information. A detailed list of the eight calculation packages and five fuel assembly description documents is provided in Attachment 3. In accordance with 10 CFR 2.390, the supporting Proprietary Information Affidavit executed by Thomas A. Danner, NAC Vice President, Engineering, is enclosed.

The significant revisions incorporated in this MAGNASTOR SAR, Revision 05A, are the following:

- License drawings incorporate specific component details, i.e., tube pin/socket, etc.
- References to the MAGNASTOR Transport Cask are deleted.
- Peak average rod burnup revised to 62.5 GWd/MTU.
- Assembly average burnup revised to 60 GWd/MTU.
- Stress summary tables added for the TSC.
- Evaluations of fuel basket displacement and dynamic stability added.
- Fuel rod buckling evaluation added.
- Porous media flow resistance and thermal analyses revised.
- Benchmarking of annulus gap turbulent flow model provided.
- Use of the optional transfer cask annulus cooling system clarified.
- Evaluation of partial length BWR fuel rods provided.
- Helium backfill pressure/density requirements clarified.
- Canister closure revised to provide redundant sealing.
- Canister reflood analysis provided.
- Neutron absorber material qualification and acceptance testing defined.
- Canister hydo test added to acceptance criteria.



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The MAGNASTOR System is currently being considered by several U.S. utilities for near-term implementation at their operating reactor sites. Therefore, NAC requests that the NRC continue the timely review and approval of the MAGNASTOR System application to support these anticipated utility needs. Any additional information requested will be promptly provided.

If you have any comments or questions, please contact me on my direct line at (678) 328-1274.

Sincerely,

Anthony L. Patko
Director, Licensing

Engineering

Enclosure - NAC Proprietary Information Affidavit

Attachments

- 1. List of SAR Changes in response to the MAGNASTOR RAI, September 2005
- 2. List of Drawing Changes for MAGNASTOR Amendment & RAI Responses, Revision 05A, September 2005
- 3. List of NAC MAGNASTOR Proprietary Information Calculation Packages and Fuel Assembly Description Documents, September 2005



Attachment 1

List of SAR Changes in Response to the MAGNASTOR RAI

NAC International

September 2005

<u>List of MAGNASTOR SAR Changes in Response to the</u> <u>MAGNASTOR RAI dated 5/23/05</u>

Chapter/ Section/ Figure/ Table	RAI Response No./ Editorial	Description of Change
Chapter 1		
Section 1	1-7 1-7	Deleted 3 rd paragraph on MAGNASTOR Transport Cask. Minor editorial changes in new 3 rd and 5 th paragraphs to refer to generic transport cask.
Section 1.1	1-7 2-3 Editorial	Deleted reference to transport cask in Adapter Plate definition Added burnup definition Revised definition of Standoffs (Channels)
	8-1 Editorial 8-1	Added Damaged Fuel definition. Added definition for Developed Cell (under Fuel Basket) and Revised Intact Fuel definition.
	1-7 1-7 7-3	Deleted Transport Cask definition. Deleted references to transport cask in Transfer Cask definition. Added definition of closure ring and also included closure ring in TSC definiton
Section 1.2	1-7 8-4	Deleted reference to the MAGNASTOR Transport Cask in the first paragraph. SAR Section text has been revised to clarify the specific analyses addressing channel considerations
	Editorial	4 th paragraph, 1 st sentence – revised for clarity
Section 1.3	1-7	Deleted reference to the MAGNASTOR Transport Cask in the first paragraph.
Section 1.3.1	1-7	Deleted reference to the MAGNASTOR Transport Cask, i.e. the last paragraph.
Section 1.3.1.1 (pages 1.3-1 & 1.3-2)	Editorial 7-3	Added reference [3]; 3 rd full paragraph, 10 th sentence – changed "base plate" to "bottom plate" Added description of closure ring throughout
Section 1.3.1.2	Fab	Revised description of retention of neutron absorber and cover to address elimination of corner clips and weld post redesign
Section 1.3.1.3 (page 1.3-5)	5-1	1 st & 3 rd paragraphs revised for clarity
Section	1-7	Inserted "a" before transport cask in 1st paragraph.
1.3.1.4	1-7	Deleted two references to transport cask in the second paragraph.
(page 1.3-6)	4-6	4 th , 5 th & 6 th paragraphs – revised to address the use of a continuous annulus cooling system
Section 1.3.1.5	1-7	Deleted section on Transport Cask
Section 1.3.2	Editorial	Revised the sequence of TSC loading activities to coincide with revised Sections 9.1.1, 9.1.2 & 9.1.3
Figure 1.3-2	7-3	Added closure ring to Figure 1.3-2.

Chapter/ Section/ Figure/ Table	RAI Response No./ Editorial	Description of Change	
Figure 1.3-4	1-7	Deleted figure of transport configuration of the Transport Cask.	
Table 1.3-1	7-3 1-1	Added closure ring design characteristics to TSC components Corrected Fuel Basket Assembly diameter to 70.76	
Table 1.3-3	Editorial	Revised wording under "Materials"	
Table 1.3-4	Editorial	Revised concrete cask construction specifications	
Section 1.5	Editorial	3 rd paragraph – revised the statement of ownership of NAC 4 th paragraph – revised the number of casks constructed by NAC	
Section 1.7	Editorial	Reference 7 – changed "ACI 318" to "ACI 318-95"; deleted reference 20 & renumbered subsequent references	
Drawing 71160-551	1-2 & Fab & Structural	Revised to add: (1) tube corner pin-to-socket connection details; and (2) boss/bolt assembly details Deleted corner clip retainers for neutron absorbers and added additional weld posts in revised pattern Increased length of tube attachment pins and associated cutouts	
Drawing 71160-561	1-3, 1-4, 5-1 & Fab & Struct.	Added locations and dimensions for air inlets and outlets Revised to specify size of S-beams Added diameter of lifting holes Added detail of concrete cask lid	
Drawing 71160-571	Fab & Structural	Added additional weld posts in revised pattern	
Drawing 71160-572	Fab & Structural	Added additional weld posts in revised pattern	
Drawing	1-5 &	Revised to specify hole diameter at the bosses	
71160-574	Structural	Increased weld size between Item 1 and Items 2 and 3	
Drawing 71160-575	1-2	Revised to add boss/bolt assembly details Revised mounting bolt material to be ASTM A193, Gr B6	
Drawing 71160-581	7-3	Increased shell weldments lengths to incorporate the closure ring and associated welds	
Drawing 71160-584	7-3	Added closure ring and associated graphics	
Drawing 71160-585	7-3	Added details of closure ring and dual port covers and associated graphics	
Drawing 71160-590	1-6 & 5-1	Revised to add design details for alternative segmented concrete cask	
Drawing 71160-591	1-2 & Fab & Structural	Revised to add: (1) tube corner pin-to-socket connection details; and (2) boss/bolt assembly details Deleted corner clip retainers for neutron absorbers and added additional weld posts in revised pattern Added bottom plate and weld for fuel tubes	
Drawing 71160-598	1-5 & Structural	Revised to specify hole diameter at the bosses Increased weld size between Item 1 and Items 2 and 3 Revised corner and side support weldment details Deleted Item 17, Note 7, and all associated graphics and weld callouts	

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Figure/ No./		
	Description of	
Table Editorial		
♣ 5 (a) A (b) (b) (b) (b) (b) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	그는 소문 그는 그는 이 이 수 없는 수 없었다면 하면 되었다. 그는 그는 그를 모르는 것이 없다.	THE CONTROL OF THE SECOND SECURITION OF THE SECOND
1. S. G. C. C. C. C. F. L. 1982 C. C. C. C. C. S. M. S. C.	그는 사람들이 가는 그들은 그들이 가장 함께 들어 없는 사람들은 하는 것이 되었다. 그 그 그 그 그 그 그 그 그 없는 것이 없다.	大批,我们就是一个人,我们就是一个人,我们就是一个人,我们就是一个人,我们就是一个人,我们就是一个人,我们就不是一个人,我们就是一个人,我们就不是一个人,我们就

Drawing	1-2	Revised to add boss/bolt assembly details
71160-599	1	Added washer and corner support weldment details
71100 533		Revised mounting bolt material to be ASTM A193, Gr B6
Drawing	6-3	New drawing: Added to define the 82-Assembly BWR Basket Assembly with the
71160-600		cell-blocking components
71100 000		con blocking components
Chapter 2		
Section 2	1-7	Deleted reference to MAGNASTOR Transport Cask
Table 2.1-1	2-1	Added NUREG-0612 as a criteria for the Transfer Cask
	Editorial	Concrete Temperature, Normal Conditions – changed "≤ 300°F (local)" to "≤ 200°F
		(local)"
Table 2.1-2	Editorial	Revised justification for Port Cover-to-Closure Lid Weld
(Pages	7-3	Added details to cover PT of closure ring.
2.1-3 &	7-2	Added details on the new hydrostatic test requirements for the TSC following loading.
2.1-4)		
Section 2.2	Editorial	1 st paragraph, 2 nd sentence – changed "are grouped into" to "are assigned to"
Section	2-2	Section revised to clarify the design basis fuel parameters
2.2.1		
Section	2-2	Section revised to clarify the design basis fuel parameters
2.2.2		
Figure	2-2	Revised the title of Figure 2.2-1 to be more descriptive.
2.2-1		Added zone descriptions for completeness
Tables	2-3	Limited maximum assembly average burnup to 60 GWd/MTU; added peak average
2.2-1 &		rod burnup limit
2.2-2		
Section	Editorial	2 nd sentence – changed "float" to "move"
2.3.2.1		
Section	Editorial	2 nd paragraph, 1 st sentence – revised throughout; 2 nd sentence – deleted
2.3.2.3		
Table 2.3-3	Editorial	Added P _s structural design criteria for rows 1, 2, 3 & 4, as well as definition of symbol
Section	8-2	Revised last sentence (before bullets) in first paragraph to address fuel retrievability
2.4.1		requirements. Added a definition of "retrievability" right after those bullets.
Section	8-2	Revised third paragraph to address fuel retrievability requirements.
2.4.2		
Section	Editorial	Next-to-last sentence - changed "TFR" to "transfer cask"; last sentence - changed
2.4.4		"inspection" to "maintenance"
Section	8-8	Revised first paragraph to include the effective ¹⁰ B loading for the BWR baskets and
2.4.6.1		to clarify the assumed effectiveness for each type of neutron absorber. Deleted the
		t
Section	Editorial	1 st paragraph, 4 th & 5 th & 6 th sentences – revised throughout to address TSC
2.4.7.3		contamination issues
(page		
2.4-5)		

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Table Editorial	Description of Change	
Lane Editorial	Description of Change	250

C4:	Editorial	2 nd
Section 2.4.7.3	Editorial	2 nd paragraph, 1 st sentence – revised for clarity
(page	}	
2.4-6)	F 4'4! - 1	T - 4 - 4 1 - 1 - 1 - 1 - 1 - 1 - 1 -
Section	Editorial	Last sentence – changed "engulfing" to "occurring"; deleted former last sentence
2.4.8	7.3	All lile Control TOO
Table 2.4-1	7-3	Added closure ring safety classification to TSC components
Section 2.5	8-2	Revised first sentence of third paragraph to address fuel retrievability requirements.
Section 2.6	Editorial	Inserted new Reference 9
	8-2	Added ISG-2 as Reference No.24.
Chapter 3		*************************************
Section	7-3	Added closure ring to table
3.1.1		
Section	7-3	Subset "TSC" – 1 st paragraph, added next-to-last sentence to address closure ring
3.1.2		
Section	Editorial	5 th sentence – changed "TSC shell" to "fuel basket"
3.1.3		
Section	7-3	Deleted old 6 th sentence; "new" 6 th sentence – changed "full penetration J-weld" to
3.4.2		"J-groove weld"; added new 7 th sentence; 9 th & 10 th sentences – revised throughout;
	_	12 th sentence – added "for the closure lid weld"
Section	3-1	Subset "TSC Lift Evaluation" – 1 st paragraph table – revised throughout; last line of
3.4.3.2		1 st paragraph – changed "2,198 psi" to "1,516 psi"; two following equations – revised
		throughout
Section	3-1	Added 2 nd sentence
3.5.1		
Section	3-1	2 nd paragraph, 2 nd sentence – changed "12 locations" to "15 locations" & deleted
3.5.1.5		parenthetical information; 3 rd paragraph, last sentence – changed "1.37 occurs at
		Section 11" to "1.23 occurs at Section 3"
Section	3-1	Subset "Normal Handling Evaluation" – 1 st full paragraph, 1 st sentence – added "P _t ";
3.5.2.1	3-2	2 nd sentence – revised Figure number; rest of paragraph revised throughout, along with
(page		a revised sketch
3.5-6)		
Section	3-1	Subset "Normal Handling Evaluation" – text & equations revised throughout
3.5.2.1		
(pages		
3.5-8 -		
3.5-11)		
Section	3-3	Subset "Thermal Stress Evaluation" – text & equations revised throughout
3.5.2.1		
(pages		
3.5-11 -		
3.5-14)		
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Chapter/ RAI		
Section/ Response No./		
Table Editorial	Description of Change	

Section	3-1	Subset "Normal Handling Evaluation" – 2 nd full paragraph, 1 st sentence – added "P _t ";
3.5.2.2	3-1	rest of paragraph revised throughout, along with a revised sketch
(pages	J-2	lest of paragraph revised throughout, along with a revised sketch
3.5-15 &		
3.5-16)	1	
Section	3-1	Subset "Normal Handling Evaluation" – text & equations revised throughout
3.5.2.2	3-1	Subset Normal Handring Evaluation — text & equations revised (moughout
(pages		
3.5-17 -		
3.5-20)		
Section	3-3	C. 1 "The 1 Canada C 1 2 1 1
i i	3 - 3	Subset "Thermal Stress Evaluation" – text, table & equations revised throughout,
3.5.2.2		including "Neutron Absorber Retainer Thermal Stress Evaluation"
(pages		
3.5-21 -		
3.5-22)		
Tables	3-3	Revised tables throughout
3.5-1 -		
3.5-4		
Section	3-1	Added last sentence
3.6.1.2		
Section	3-1	Subset "Off-Normal Internal Pressure with Normal Handling" – 1st partial sentence –
3.6.1.2		changed "1.32 (p _m + P _b) occurs at Section 11 (center of bottom plate)" to "1.18 (p _m +
(Page		P _b) occurs at Section 3"
3.6-2)		Subset "Off-Normal Handling with Normal Internal Pressure" – next to last sentence –
		changed "1.45 ($p_m + P_b$) occurs at Section 1 (bottom plate/shell)" to "1.27 ($p_m + P_b$)
		occurs at Section 3"
Section	3-1	Revised text, table & equation
3.6.2.1		
(pages		
3.6-3 &		
3.6-5)		
Section	3-1	1 st full paragraph, table & equation revised throughout
3.6.2.2		
1		
3.6.2.2 (page 3.6-6)		
(page	3-1	Added new text & equations to address maximum bolt load & maximum shear load
(page 3.6-6)	3-1	Added new text & equations to address maximum bolt load & maximum shear load
(page 3.6-6) Section 3.6.2.2	3-1	Added new text & equations to address maximum bolt load & maximum shear load
(page 3.6-6) Section 3.6.2.2 (pages	3-1	Added new text & equations to address maximum bolt load & maximum shear load
(page 3.6-6) Section 3.6.2.2 (pages 3.6-8 -	3-1	Added new text & equations to address maximum bolt load & maximum shear load
(page 3.6-6) Section 3.6.2.2 (pages 3.6-8 - 3.6-11)		
(page 3.6-6) Section 3.6.2.2 (pages 3.6-8 - 3.6-11) Tables	3-1	Added new text & equations to address maximum bolt load & maximum shear load Revised tables throughout
(page 3.6-6) Section 3.6.2.2 (pages 3.6-8 - 3.6-11) Tables 3.6-1 -		
(page 3.6-6) Section 3.6.2.2 (pages 3.6-8 - 3.6-11) Tables	3-1	

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Figure/ No./		
Table Editorial	Description of Change	

Section	3-1	2 nd paragraph, 2 nd sentence – changed "1.75 occurs at Section 11" to "1.59 occurs at
3.7.1.1		Section 3"
Section 3.7.1.2.1	3-1	2 nd paragraph, 2 nd sentence – changed "3.61" to "3.71"
Section 3.7.1.2.2	3-1	2 nd paragraph, 2 nd sentence – changed "9.2 ksi" to "9.3 ksi"; revised equation throughout
(pages 3.7-2 & 3.7-3)		
Section	3-1	1 st paragraph – added new 2 nd sentence
3.7.1.3		2 nd paragraph, 2 nd sentence – revised throughout
Section 3.7.2.1.1 (Page 3.7-5)	3-1	2 nd full paragraph – deleted sketch
Section 3.7.2.1.1 (Pages 3.7-7 & 3.7-8)	3-1	Subset "PWR Neutron Absorber Evaluation" – revised throughout
Section 3.7.2.1.2 (Page 3.7-8)	3-5	Subset "PWR Fuel Tube Evaluation" – 1 st paragraph, 2 nd sentence – changed "40g" to "35g"; 2 nd paragraph, 1 st sentence – changed figure numbers & "tube ID" to "tube IDs" & deleted "and locations for stress evaluations"; 3 rd paragraph, 2 nd sentence – added reference "[8]"; 3 rd sentence – added "primary"; 5 th sentence – revised throughout
Section 3.7.2.1.2 (Page 3.7-9)	3-5	Subset "PWR Fuel Tube Evaluation" (cont'd) – 1 st paragraph, 1 st sentence – added "PWR"; 3 rd sentence – changed 31.72 ksi respectively" to "31.1 ksi, respectively (0° basket orientation)"; changed equation following "Membrane plus bending"; next paragraph & equations – revised throughout
Section 3.7.2.1.2 (Page 3.7-10)	3-5	Subset "PWR Fuel Tube Evaluation" (cont'd) – revised throughout Subset "PWR Neutron Absorber and Retainer" – revised throughout
Section 3.7.2.1.2 (Page 3.7-11)	3-5	Subset "PWR Neutron Absorber and Retainer" (cont'd) – revised throughout
Section	3-5	Subset "PWR Neutron Absorber and Retainer" (cont'd) – revised throughout
3.7.2,1.2 (Page 3.7-12)	3-9	Subset "PWR Corner Support Weldment Evaluation" – revised throughout
Section 3.7.2.1.2 (Page 3.7-13)	3-9	Subset "PWR Corner Support Weldment Evaluation" (cont'd) – revised throughout

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Table Editorial	Description of Change	

Section	3-10	Subset "PWR Side Support Weldment Evaluation - corrected typographical error
3.7.2.1.2		identified in RAI 3-10
(Page	3-9	Subset "PWR Side and Corner Weldment/Fuel Tube Attachment Evaluation" –
3.7-14)		revised throughout
Section	3-9	Subset "PWR Side and Corner Weldment/Fuel Tube Attachment Evaluation" (cont'd)
3.7.2.1.2		- revised throughout
(Pages		
3.7-15 -		
3.7-17)		
Section	3-9	Subset "PWR Side and Corner Weldment/Fuel Tube Attachment Evaluation" (cont'd)
3.7.2.1.2		- revised 2 equations
(Page		Subset "PWR Fuel Basket Buckling Evaluation" – 1st paragraph, revised and
3.7-18)		combined with last 2 sentences of previous 4 th paragraph (deleted previous 2 nd & 3 rd
		paragraphs)
Section	3-11	Subset "PWR Fuel Basket Buckling Evaluation" (cont'd) –revised 2 nd parameter used
3.7.2.1.2		for buckling evaluation & following equations
(Page		Subset "PWR Basket Displacement" – added new section
3.7-21)		
Section	3-8	Subset "PWR Basket Displacement" (cont'd) - added new section
3.7.2.1.2		
(Page		
3.7-22)		
Section	3-6	Subset "24-inch Concrete Cask End-Drop" – removed sketch titled "Common area of
3.7.2.2.1		Fuel Tube and Connector Pin Intersection"
(Page		
3.7-23)		
Section	3-5	Subset "BWR Neutron Absorber Evaluation" –revised throughout
3.7.2.2.1		
(Page		
3.7-25)		
Section	3-5	Subset "BWR Fuel Tube Evaluation" - revised throughout
3.7.2.2.2		
(Page	Ì	
3.7-26)		
Section	3-5	Subset "BWR Fuel Tube Evaluation" (cont'd) – revised throughout
3.7.2.2.2		
(Page		
3.7-27)		
Section	3-5	Subset "BWR Fuel Tube Evaluation" (cont'd) – revised throughout
3.7.2.2.2		Subset "BWR Neutron Absorber and Retainer" – revised throughout
(Page		
3.7-28)		
Section	3-9	Subset "BWR Neutron Absorber and Retainer" (cont'd) – revised throughout
3.7.2.2.2		Subset "BWR Corner Support Weldment Evaluation" – 1 st paragraph, 1 st sentence –
(Page		added "plastic"; remainder of section revised throughout
3.7-29)		

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네트 회 그 아들까 걸었습니다. 1학교 시간 4학교 교육 기계	▮ 8%、例:"一点有名户还是一部的"干净生活"。 计一项页数数	[기원(대한 :) 전화 (17) : 이 전 : 4 시간에 12 : 4	경기 그는 그림들이 전 문화가 되다. 무롱하는 그 사람은 말씀이 되었다. 그 그 것에?
Chapter/ RAI		그리아들이 마음 보다 아는 아는 강점 아이를 하는 일반 이 마음이 하다 말했습니다.	유럽 등이 이렇게 되었다고 말았습니다!! 얼마는 그리는 사람들이 없어요요요? 그 없어요.
L (hanter/ KAI	★ 1 시리하다 중 10 1년 시간 시간 시간 구하는 1200년 5년 1년	그런 말소요요 그 마음으로서 발표되는 바람들은 것같아 그는 어느 그는 그들이 살았다. 사람들은 사람	그 이 그는 이 경험 이 중 속 점점에도 하는 누고 있었다. (취치 미요리 다시 함께다.)
Le Chubter, Le France	4 15 1 4 A A STANDARD SEPARATE TO THE ACCUMULATION	다시 마음 열심 그리고 그들은 양 사람들은 무슨 사람들이 사용하는 사람들이 되었다면 하는데 되었습니다.	경독에 따른에게 되다. 한번 중요한 경우 등 시간 시간 하셨다는 중요한 그리고 하는 사람.
	🛊 [Ng 17] [PP PP NTT B T LL LAPEN, July 1994 A Saget] 200 (Props.	사람들의 사람들은 사람들이 그 사람들은 경기가 그 기술들은 동생으로 하는다고 사랑하고 있다.	And Nove to the second second of the first the Salar Second of the second
Section/ Response	1998 Sulab - N. Stabille Co., 1988 Subsuch	소식다. 그 이번 이 경기인데 이 사람들은 이 이 이 전에 무겁을 먹는데 이 이 아름답다.	a Budin'n'i Makenbalaa mwatama in 2011 ilia ka kati ini, a a asa a a a 📗
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			2009년 : 이 트 시민이에 아닌데 그 아이번 방속 모습을 2004년대.
100 0 172		보고가 되다가 하는 전문화에 사랑 하다면 하는 것 같아 하는 일반 물리를 가득하고 했다.	어떤 어떤 병원으로 있는데 나는 사람들이 하는 사람들이 어떤 것은 것이 되었다. 그 나는 것이 없다.
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Section 3.7.2.2.2 (Page	3-9	Subset "BWR Corner Support Weldment Evaluation" (cont'd) – revised throughout
3.7-30) Section 3.7.2.2.2 (Page 3.7-31)	3-9	Subset "BWR Side Support Weldment Evaluation" – revised throughout Subset "BWR Side and Corner Weldment/Fuel Tube Attachment Evaluation" – 1 st paragraph, 2 nd sentence – changed "16" to "eight"; 2 nd paragraph – revised throughout; 3 rd paragraph, 2 nd sentence – changed "Grade B8" to "Grade B6" & revised equations throughout
Section 3.7.2.2.2 (Pages 3.7-32 – 3.7-36)	3-9	Subset "BWR Side and Corner Weldment/Fuel Tube Attachment Evaluation" (cont'd) - revised throughout
Section 3.7.2.2.2 (Page 3.7-37)	3-11 3-8	Subset "BWR Basket Buckling Evaluation" – 1 st paragraph – revised throughout; deleted previous 2 nd , 3 rd & 4 th paragraphs Revised 2 nd parameter used for buckling evaluation & revised equations throughout
Section 3.7.2.2.2 (Page	3-11	Subset "BWR Basket Buckling Evaluation" (cont'd) – 1 st paragraph – revised 2 equations Subset "BWR Basket Displacement" – added new section
3.7-38) Figures 3.7-1 -	3-8	Inserted new figures Note: Other figures deleted & renumbered accordingly—i.e., old Figure 3.7-21 is
3.7-3 Tables 3.7-1 -	3-1	now Figure 3.7-4. Revised throughout
3.7-3 Tables 3.7-4 -	3-9	Revised throughout, along with footnotes
3.7-6 Tables 3.7-7 - 3.7-9	3-5 3-9	Revised throughout, along with footnotes
Table 3.7-10	3-9	Revised throughout, along with footnote; removed previous tables 3.7-7, 3.7-10 & 3.7-13 & renumbered subsequent tables
Section 3.8 (pages 3.8-1 - 3.8-7)	3-12	Added new section & Figures 3.8-1 & 3.8-2 to address fuel rod buckling Note: New Section 3.8.3 replaces old Section 3.8.
Section 3.9	Editorial	Deleted year on reference 1; revised reference number 5; deleted reference 15 (was a duplicate of 5) & renumbered subsequent references; added references 24 – 28.
Section 3.10	Editorial	Added an introductory section
Section 3.10.1.1	3-13	1 st paragraph, 11 th sentence – added "; however, friction is not of the basket"

Chapter/ Section/ Figure/ Table	RAI Response No./ Editorial	Description of Change
Section 3.10.1.2 (Page 3.10.1-2)	3-1	Table revised throughout
Section 3.10.1.2.1 (Page 3.10.1-2)	3-1	Revised throughout
Section 3.10.1.2.1 (Page 3.10.1-3)	3-7	1 st paragraph revised throughout
Section 3.10.1.2.2 (Page 3.10.1-3)	3-1	Added new section
Section 3.10.1.2.3 (Page 3.10.1-3)	3-1 3-8	Revised throughout
Section 3.10.1.2.3 (Page 3.10.1-4)	3-8	1 st partial paragraph – revised throughout
Section 3.10.1.3.1	3-1	1 st paragraph, last sentence – revised throughout; deleted next 2 sentences & equation
Section 3.10.1.3.2 (page 3.10.1-4)	3-3	Added new section
Section 3.10.1.3.2	3-3	Continuation of new section (text & table)
Section 3.10.1.3.3	3-1	1 st paragraph, 3 rd sentence – revised throughout; 4 th sentence – changed "40g" to "35g"; last sentence – changed "40g" to "35g"; 2 nd paragraph, 1 st sentence – changed "0.87 inch" to "0.84 inch"; 2 nd sentence – changed "40g" to "35g"
Section 3.10.1.4.1	3-1	2 nd paragraph, last sentence – revised throughout; 3 rd paragraph, 1 st sentence – revised throughout; 4 th paragraph, 1 st sentence – revised throughout; added new 5 th paragraph
Section 3.10.1.4.2	3-3	Added new last sentence
Section 3.10.1.4.3	3-1	Revised throughout
Figures 3.10.1-7 – 3.10.1-10	3-1 3-8	Added 4 new figures & renumbered subsequent figures (previous Figures 3.A-7 & 3.A-8 removed)
Figures 3.10.1-13 – 3.10.1-20	3-1	Added 8 new figures

Chapter/ Section/	RAI Response			
Figure/ Table	No./ Editorial	Description of Change		
Section 3.10.2.1	3-13	1 st paragraph, added last sentence		
Section 3.10.2.2	3-1	Revised table throughout		
Section 3.10.2.2.1 (page 3.10.2-2)	3-1	Revised throughout		
Section 3.10.2.2.1 (page 3.10.2-3)	3-1	Revised throughout		
Section 3.10.2.2.2	3-3	Added new section		
Section 3.10.2.2.3	3-8	1 st paragraph – revised throughout		
Section 3.10.2.3.1 (page 3.10.2-4)	3-1	1 st partial paragraph, 2 nd sentence – added "bounding"; deleted next 2 sentences & equation		
Section 3.10.2.3.2	3-3	Added new section (text, sketch & table)		
Section 3.10.2.3.3	3-1	1 st paragraph, 3 rd sentence – revised throughout; 4 th sentence – changed "40g" to "35g"; last sentence – changed "40g" to "35g" 2 nd paragraph – revised throughout		
Section 3.10.2.4.1 (page 3.10.2-5)	3-1	2 nd paragraph, last sentence – revised throughout		
Section 3.10.2.4.1 (page 3.10.2-6)	3-1	1 st paragraph, 1 st sentence – revised throughout 2 nd paragraph, 1 st sentence – revised throughout; added new last sentence		
Section 3.10.2.4.2 (page 3.10.2-6)	3-3	Added new last sentence		
Section 3.10.2.4.3	3-1	Revised throughout		
Figures 3.10.2-5 & 3.10.2-6	3-1	Revised figures		
Figures 3.10.2-7 – 3.10.2-10	3-1 3-8	Added 4 new figures & renumbered subsequent figures (previous Figures 3.B-7 & 3.B-8 removed)		

		1.11.10		
Figures	3-1	Added 8 new figures		
3.10.2-13 -				
3.10.2-20		at was a state of the state of		
Section	3-1	Subset "TSC Finite Element Model Description" – 1st paragraph, 5th sentence – added		
3.10.3		"standoffs or transfer cask inner shell"		
Section	3-1	Subset "Boundary Conditions for Normal Conditions and Off-Normal or Accident		
3.10.3		Events" - "Inertial Load" - revised last line of table		
Section 3.10.3	3-1	Subset "Boundary Conditions for Normal Conditions and Off-Normal or Accident Events" – "Pressure Load – Internal Pressure" – 2 nd sentence – revised throughout; "Pressure Load – Dead Load, Handling and 24-inch Drop", 2 nd sentence – changed "100,000 lb" to "90,000 lb"		
Section	3-1	Subset "Boundary Conditions for Normal Conditions and Off-Normal or Accident		
3.10.3		Events" - " "Pressure Load - Dead Load, Handling and 24-inch Drop" - revised		
(page		equation		
3.10.3-3)		"Pressure Load - Off-Normal Handling" - added new section		
		"Pressure Load – Tip-Over" – revised throughout		
Section	3-1	Subset "Temperatures for Thermal Stress Analysis" – last line of listing – changed		
3.10.3		"168 inch" to "166 inches" and "520°F" to "510 °F"		
(page				
3.10.3-4)				
Section	3-1	Subset "Post-Processing", 2 nd sentence – changed "12 locations" to "15 locations";		
3.10.3		last sentence – changed "Section 10" to "Section 11"		
		Subset "TSC Analysis Result Details" – added new section		
Figures	3-1	Revised throughout		
3.10.3-1 &				
3.10.3-2				
Tables	3-1	Added new stress summary tables		
3.10.3-1 -	3-4			
3.10.3-17				
Section	3-11	Added new section, including 9 figures & 1 table, to evaluate basket stability for the		
3.10.6		concrete cask tip-over accident condition		
(pages				
3.10.6-1 -				
3.10.6-17)				
Section	3-8	Added new section, including 1 figure to evaluate the possibility of fuel tube		
3.10.7		deformation in case of a concrete cask tip-over accident		
(pages				
3.10.7-1 -				
3.10.7-3)		<u> </u>		
Chapter 4	T 1'. ' 1	CI 1 C C WHITEC 152(I) WHITEC 15(EV)		
Section 4	Editorial	Changed reference from "NUREG-1536" to "NUREG-1567"		
Section 4.1	Editorial	1st paragraph, 3rd sentence – added "structural protection"		
(page		2 nd paragraph, 3 rd sentence – revised throughout		
4.1-1)	2.2	3 rd paragraph, 4 th sentence – added "allowable"		
	2-3	5 th paragraph, 1 st sentence – changed "40 kW" to "37 kW"; 2 nd sentence – changed		
		"1.08 kW" to "1 kW"		

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Table Editorial	Desc	ription of Change

Section 4.1	Editorial	1 st partial paragaph, last sentence – revised throughout	
(page		3 rd paragraph, 4 th sentence – deleted "For either fuel type"	
4.1-2)			
Figure	Editorial	Revised 1 st row, columns A, B & C, of table below figure	
4.1-1	•		
Table 4.1-2	Editorial	Changed reference for concrete from "NUREG-1536" to "NUREG-1567"	
Section 4.3	Editorial	2 nd paragraph, last line – changed "NUREG-1536" to "NUREG-1567"	
Section	Editorial	1 st partial paragraph, 1 st complete sentence – revised throughout;	
4.4.1 (page	4-4	2 nd sentence – revised throughout	
4.4-3)			
Section	4-5	Subset "Modeling of the Concrete Cask" – 2 nd paragraph – revised throughout	
4.4.1.1		(replaces previous paragraphs 2 & 3)	
(pages			
4.4-4 &			
4.4-5)			
Section	4-5	Subset "Modeling of the TSC" – 2 nd full paragraph, last line before equation – added	
4.4.1.1		"used in FLUENT"; deleted old 5 th line of equation explanation; added new 5 th & 6 th	
(page		lines to equation explanation; revised following paragraph throughout	
4.4-8)			
Section	4-5	Subset "Modeling of the TSC" (cont'd) – 1 st partial paragraph, 1 st line – added	
4.4.1.1		"resistance factors is neglected"; 1st full paragraph, 3rd sentence – added "These areas"	
(page			
4.4-9)	, i		
Section	2-3	Subset "Heat Generation" – 1 st paragraph, 2 nd sentence – changed "40 kW and 38 kW"	
4.4.1.1		to "37 kW and 35 kW";	
		2 nd paragraph, 2 nd sentence – changed "40 kW or 1.08 kW" to "37 kW or 1.0 kW"; 4 th	
		sentence – changed "40 kW" to "37 kW"; 3 rd paragraph, 2 nd sentence – changed "38	
		kW" to "35 kW" & "437 Watts" to "402 Watts"; 5th sentence – changed "437 Watts"	
		to "402 Watts"; 7 th sentence – changed "437 Watts" to "402 Watts"	
Section	7-2	Subset "Pressure of the Helium Backfill" – 2 nd line – changed "lbm/in ³ " to "lbm/ft ³	
4.4.1.1		(0.760g/liter)"	
(page			
4.4-11)			
Section	Editorial	Subset "Mesh Sensitivity Evaluation" – 3 rd paragraph, 7 th sentence – added "which	
4.4.1.1		bounds the design basis condition for the 37 kW"	
(page:	-		
4.4-12)			
Section	4-4	Subset "Heat Transfer by Radiation" – 1 st paragraph – added sentences 2-5 for clarity	
4.4.1.1			
(page			
4.4-13)			
Section	Editorial	2 nd paragraph – revised throughout	
4.4.1.5	4-6	Deleted last paragraph	

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Table	Editorial		#\$55.51.0000m20m - 0 5 611 1	IPECTION	n of Change	[5] A. S.
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Section	Editorial	Subset "Evaluation of the Water Phase" – revised throughout
4.4.1.5	4-7	
(pages		
4.4-18 &		
4.4-19)		
Section	Editorial	Subset "Evaluation of the Drying Phase – Pressurized Helium Drying System" –
4.4.1.5	4-7	revised title & broke into two sections; this section revised throughout
Section	Editorial	Subset "Evaluation of the Drying Phase – Vacuum Drying System" – added new
4.4.1.5	4-7	section
(pages		
4.4-20 -		
4.4-22)		
Section	Editorial	Subset "Evaluation of the Helium Phase" – revised throughout
4.4.1.5		1011000 211101000 011101000000000000000
Section	Editorial	Subset "Evaluation of Moving the TSC into the Concrete
4.4.1.5	Zanomai	Cask" – 2 nd & 3 rd sentences – revised throughout; last sentence – changed "movement
7.7.1.5		and lid installation on the concrete cask" to "movement and placement in the concrete
		cask"
Section	Editorial	Subset "Normal Conditions of Storage" – 1 st paragraph – added new last sentence; 3 rd
4.4.3 (page	Editorial	paragraph, last sentence – changed "266°F" to "262 °F"
4 0		paragraph, last sentence – changed 200 r to 202 r
4.4-24)	T 1' 1	G.1 (45T C. C. 15) 2 15h 0 cth
Section	Editorial	Subset "Transfer Condition" – 1 st paragraph, 5 th & 6 th sentences – revised throughout
4.4.3 (page		
4.4-24)		and the second s
Section	Editorial	Subset "Transfer Condition" (cont'd) – 1 st partial paragraph, 4 th full sentence –
4.4.3 (page		changed "48 hours" to "36 hours"; 5th sentence – changed "48 hours" to "36 hours"
4.4-25)		2 nd & 3 rd paragraphs – replaced former paragraph with new text
Section	7-2	Subset "Maximum Internal Pressure for the TSC Containing PWR Fuel" – 1st full
4.4.4 (page		paragraph, 1 st sentence – changed "477°F" to "464 °F"; added new 2 nd thru 4 th
4.4-27)	· · · · · · · · · · · · · · · · · · ·	sentences; added new 4 th paragraph to indicate origin of backfill pressure
Section	7-2	Subset "Maximum Internal Pressure for the TSC Containing PWR Fuel" (cont'd) –
4.4.4 (page		added new last paragraph to indicate origin of backfill pressure
4.4-28)		Subset "Maximum Internal Pressure for the TSC Containing BWR Fuel" – added new
		last paragraph to indicate origin of backfill pressure
Figure	Editorial	Deleted previous Figure 4.4-3, Reynold's Number Concrete Cask Annulus &
4.4-3	4-5	renumbered all subsequent figures
Figure	Editorial	Revised figure throughout
4.4-5	4-5	
Figure	Editorial	Revised figure throughout
4.4-14	4-5	
Figure	Editorial	Revised figure throughout
4.4-15	4-5	
Figure	Editorial	Added new figure
4.4-16	4-5	The state of the s
Figure	Editorial	Added new figure
4.4-17	4-5	Added new tighte
7.7-1/	4- 3	

Chapter/ RAI Section/ Response Figure/ No./ Table Editorial	The part of the pa	Description of Change	

Tables	Editorial	Added footnote describing orientation of Kxx, Kyy, and Kzz.
4.4-1 &	Editorial	Added foothfole describing offentation of Kxx, Kyy, and Kzz.
4.4-2		
Tables	Editorial	Revised throughout
4.4-3 &	4-5	Revised throughout
4.4-3 &	4-3	
Table	Editorial	Added new table
4.4-5	4-5	Added new table
Section 4.5	Editorial	2 nd paragraph, last sentence – changed "40 kW and 38 kW" to "37 kW and 35 kW";
Section 4.5	Editorial	3 rd paragraph – revised the following two tables throughout Subset "Off-Normal Event TSC Internal Pressures" – 2 nd sentence – revised throughout
Section 4.6.1	Editorial	Table following 2 nd paragraph revised throughout
Section	Editorial	1 st full paragraph, 1 st sentence – changed "128-in-diameter" to "136-in-diameter"; 2 nd
4.6.2	Lunonai	paragraph – added new last sentence
		paragraph – added new last sentence
(page 4.6-2)		
Section	7-2	Paying to indicate origin of heal-fill processor. Provide telegrance allowed on heal-fill
	1-2	Revised to indicate origin of backfill pressure. Provide tolerance allowed on backfill
4.6.4		prior to reaching structural analysis inputs.
(pages		
4.6-3 &		
4.6-4)	T-dia:-1	Decided Community 20 % added Community 21 % 22
Section 4.7	Editorial	Revised reference number 20 & added reference numbers 21 & 22
Section 4.8	Editorial	Added section introduction
Section	4-4	3 rd paragraph – revised throughout
4.8.2		Subset "Permeability (α) for the PWR Fuel Assembly" – revised title & section
(pages		throughout
4.8.2-1 -		Added new section – Subset "Permeability (α) for the BWR Fuel Assembly"
4.8.2-3)		
Figures	4-4	Added new figures
4.8.2-1 -		
4.8.2-4		
Section	4-5	Added new section titled "Benchmark Evaluation of the Two-Dimensional
4.8.3		Axisymmetric Methodology for Annular Cooling in the Concrete Cask for
(pages		MAGNASTOR"
4.8.3.1 -		
4.8.3.9)		
Figures	4-5	Added new figures
4.8.3-1 -		
4.8.3-4		

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Chapter/ RAI			たる3、400分の 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
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Chapter 5				
All	2-3	Revised terms where needed from burnup to assembly average burnup		
sections,				
including		·		
Tables in				
sections 5.2				
& 5.8				
Sections	5-2	Added table containing maximum dose payload types. Added references to table in		
5.1.1 &		relevant SAR sections.		
5.1.2 &				
Table 5.1-3				
Section	5-2	Last paragraph, 1 st sentence – revised throughout to reflect licensing dose rates.		
5.1.1				
Section	5-2	Last paragraph, 2 nd & 3 rd sentences – revised throughout to reflect licensing dose rates.		
5.1.2				
Table 5.1-1	5-2	Revised throughout to reflect licensing dose rates		
Table 5.1-2	5-2	Revised throughout to reflect licensing dose rates		
Section 5.2	5-5	Added SAS2H validation and use information.		
Section	5-6	Clarified use of MCBEND spectrum in MCNP evaluation.		
5.2.2				
Section	5-1	Added text describing concrete cask model top section.		
5.5.1.2				
Figures	5-1	Added details to support RAI response		
5.5-1 &				
5.5-2				
Sections	5-4 & 5-7	Added additional discussions on NAC-CASC method. Added breakdown of dose by		
5.5.3,		source to PWR and BWR 2x10 cask array exposure plots. Specified that maximum		
5.8.3.5 &		dose rate payloads are used in the site boundary evaluations.		
5.8.4.5 &				
Figures				
5.8.3-15 &		·		
5.8.8-7				
Figure	5-1	Added sketch of concrete cask model top section.		
5.5-3				
Figure	Editorial	Added note for clarity		
5.5-6				
Table 5.5-2	Editorial	Changed dimension for Lid Steel from "1.0-in. thick (over cask cavity)" to "1.0-in. total thickness"		
Coatio-	5-4	Added description of code modifications and increased analysis method discussion.		
Section	J-4	Changed wording from benchmark to validation.		
5.6.1.2				
	Editarial	6 th paragraph, 1 st sentence – changed "benchmarked" to "validated"		
C = -4: -	Editorial	2 nd paragraph, 1 st sentence – changed "785 mrem/hr" to "430 mrem/hr" to reflect		
Section	5-2			
5.6.3.1		licensing dose rates		
		3 rd paragraph, last sentence – added for clarity		

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Figure/ No./		
Table Editorial	Description of C	

Section	5-8	Added "bounding" to the dose/exposure descriptions & figure title; added & changed	
5.6.4 &		references	
Figure			
5.6-8			
Figures	5-2	Revised throughout to reflect licensing dose rates	
5.6-1 thru	- -		
5.6-7			
Section 5.7	Editorial	Added references 31 through 36	
Section 5.8	Editorial	Added an introductory section	
Section	5-2	1 st paragraph, 2 nd sentence – changed "40 kW per cask (1.081 kW per assembly)" to	
5.8.3.2		"37 kW per cask (1 kW per assembly)	
Section	5-2	Added discussion of modeled concrete cask top and outlet dose rates vs. dose rates	
5.8.3.5		calculated with standard assembly concrete cask.	
		Included statement on use of bounding heat load (40 kW PWR, 38 kW BWR) for	
		skyshine analysis.	
Figures	5-2	Revised throughout to reflect licensing dose rates	
5.8.3-3 thru	_		
5.8.3-13			
Table	5-2	Revised table throughout	
5.8.3-4		Terribed more intensitions	
Section	5-2	1 st paragraph, 2 nd sentence – changed "38 kW per cask (0.437 kW per assembly)" to	
5.8.4.2	J 2	"35 kW per cask (0.402 kW per assembly)	
3.0.4.2		Deleted last line of table	
Section	5-2	Included statement on use of bounding heat load (40 kW PWR, 38 kW BWR) for	
5.8.4.5	<i>5 2</i>	skyshine analysis.	
Figures	5-2	Revised throughout to reflect licensing dose rates	
5.8.4-3 thru	3-2	Revised throughout to refrect needshing dose rates	
5.8.4-13			
Figure	5-2	Revised dose rate tabulation below figure to reflect licensing dose rates	
5.8.4-15	3-2	Revised dose rate tabulation below figure to reflect freelisting dose rates	
Table	5-2	Revised last 3 rows of table	
5.8.4-5			
Table	2-3	Added footnote "a" to table title & at bottom of page	
5.8.4-9			
Section	5-2	2 nd paragraph, last sentence – changed "15×15" to "14×14"	
5.8.5.2.1		The second secon	
Section	5-2	2 nd paragraph, last sentence – changed "15×15" to "14×14"	
5.8.5.2.2		- Family and the same of the s	
Section	5-2	Revised table throughout	
5.8.5.2.3	- -		
Figures	5-2	Revised throughout to reflect licensing dose rates	
5.8.5-1 thru 📙		1	
5.8.5-1 thru 5.8.5-4			
5.8.5-1 thru 5.8.5-4 Section	2-3	1 st paragraph – changed "1.081 W" to "1 kw"; changed heat load column of following	

Chapter/ RAI		
Section/ Response		
Figure/ No./	Description of Change	
Table Editorial	Description of Change	799) 31(38)

	T	
Section	2-3	1 st sentence – revised throughout
5.8.7.3		
Table	2-3	Revised throughout
5.8.7-1		
Section	5-4	Added section containing NAC-CASC input files
5.8.8.4		
Figure	5-3	Revised figure on pages noted
5.8.8-5		
(pages		
5.8.8-28,		
5.8.8-30,		
5.8.8-31 &		
5.8.8-33)		
Figure	5-3	Revised figure on pages noted
5.8.8-6		Trovisod figure on puges noted
(pages		
5.8.8-40,		
5.8.8-41,		
5.8.8-43 &		
5.8.8-45)		
	<u> </u>	
Chapter 6	E-3141-1	1 St
Section 6.1	Editorial	1 st paragraph, 9 th sentence – revised throughout
(page	1-7	1 st paragraph, 10 th sentence – deleted "or transport cask"
6.1-1)	Editorial	4th paragraph, 1st sentence – added "/developed cells"
	Editorial	4th paragrah, 5th sentence – added "specified on the License Drawings"
Section 6.1	Editorial	1 st full paragraph, 2 nd sentence – revised throughout
(page		
6.1-3)		
Table 6.1-2	6-18	Corrected column labeling error described in RAI 6-18.
Section 6.2	6-12	3 rd paragraph – added to address BWR partial-length fuel rods
Tables	6-12	Revised to indicate the number of partial length rods
6.1-2,		·
6.2-2,		
6.4-2,		
6.7.6-6		
Figure	6-12	Added to indicate the position of partial length rods
6.2-1		
Section		Added last bullet
6.3.2		
(page		·
6.3-3)		
Figure	6-2	Updated per RAI 6-2 to indicate "interface width."
6.3-1	. 	
Table 6.3-1	6-1	Corrected data entry per RAI 6-1. Error in data entry for borated water composition.
+ u 0 1 0 0 . J - 1	0.1	Constitution of the second of

Chapter/ RAI		
Section/ Response Figure/ No./		
Table Editorial	Description of Change	

Sections	6-2	Revised text to clarify "interface width" location.
6.4.2.1,	""	The visit to startly interface within fourteen.
6.7.3.1 &		
6.7.6.1		
Table 6.4-2	6-4, 6-6 &	Added 120 mil maximum channel thickness as a limit
& 6.7.2-3	6-7	Justified no specification for pellet OD, rod pitch, & clad thickness
Table 6.4-2	6-18	Corrected column labeling error described in RAI 6-18.
Section 6.6	Editorial	Corrected reference #9
Section 6.7	Editorial	Added an introductory section
Section	6-4	3 rd paragraph – new sentences 8, 9 & 10
6.7.1		
Figure	Fab	Revised figure and note
6.7.1-1		
Section	Editorial	4 th paragraph, 3 rd sentence – added "wet unborated gap"
6.7.2		rg.r.
(Page	į	
6.7.2-2)		
Table	6-6	Revised throughout
6.7.2-3		
Sections	6-8	Subset "Moderator Density Variations" – Revised Figure
6.7.3.1 &		6.7.3-1, added Figure 6.7.3-2 & augmented text to indicate pellet-to-clad condition for
Figures	1	moderator density plots and justify use of maximum water density for bounding
6.7.3-1 &		condition
6.7.3-2		
Sections	6-8	Subset "Fabrication Tolerance" – Revised to indicate constant absorber areal density
6.7.3.1 &		for fabrication tolerance cases (minimum absorber content per drawing/testing).
6.7.6.1		
Section	6-15	Corrected typographical error described in RAI 6-15.
6.7.3.2		
Sections	6-9	Revised text and tables to clarify conditions on which maximum reactivities reported
6.7.3.2 &		are based.
6.7.6.2		·
Sections	6-5	Added section for PWR absorber removal, replacement and attachment modification
6.7.3.3,		(includes new figure & tables).
6.7.3.4,		
Figure		
6.7.6-3;		
Tables		
6.7.3-7,		
6.7.3-8 &		
6.7.3-9		
Tables	6-6	Replaced BW15H4 assembly with BW15H3 in sensitivity studies
6.7.3-2 and		
6.7.3-3		
Section	6-4	3 rd paragraph – new sentences 5, 6, 7, 8 & 9
6.7.4		

Chapter/ Section/ Figure/ Table	RAI Response No./ Editorial	Description of Change
Figure 6.7.4-1	6-9	Revised figure
Sections 6.7.5 & 6.7.6.1	6-11	Revised to indicate the use of the 87-assembly basket configuration for the majority of fuel and basket variation studies.
Section 6.7.6.1	6-16	Added 82-assembly moderator density curves. Modified existing curve to show flooded pellet to clad gap results.
Figures 6.7.6-1 & 6.7.6-2	6-4	Revised to show 87-assembly & 82-assembly basket BWR water density variations
Sections 6.7.6.3, 6.7.6.4, Figures 6.7.6-3 & 6.7.6-4; Tables 6.7.3-7, 6.7.3-8 & 6.7.3-9	6-5	Added section for BWR absorber removal, replacement and attachment modification (includes new figure & tables).
Tables 6.7.6-2, 6.7.6-3 & 6.7.6-4.	6-17	Added B9_76A data.
Table 6.7.6-5	6-13	Added table in response to RAI containing maximum reactivities versus USL
Table 6.7.6-6 (formerly 6.7.6-5)	6-18	Corrected column labeling error described in RAI 6-18.
Section 6.7.7	6-14	Augmented text justifying benchmark set.
Chapter 7		
Sections 7.1, 7.1.1, 7.1.2, 7.1.3 & 7.1.4	7-3	Revised discussion of confinement boundary closure to incorporate details of incorporation of the secondary confinement components (i.e., closure ring and outer (i.e., redundant) vent and drain port covers, welding, inspection, etc.
Section 7.1.1 (page 7.1-3)	Editorial	Last paragraph, 2 nd sentence – added "qualified"; 3 rd sentence – added ", or water,"
Figure 7.1-1	7-3	Updated TSC containment boundary figure to include closure ring and redundant port covers.

	[20] 사람이 되었다면 하는 사람이 있다면 하는 사람들이 되지 않는데 사람들이 되었다면 하는데 하는데 되었다.
Chapter/ RAI	[] : 화하하는 경우 한쪽부터 하다면 있으면 하는 학생들이 그 그들은 화로 하는 사람들은 모든 그는 그는 그를 가져가 그렇게 말했다.
] [
Section/ Response	l - B. 프라틴 영향의 전환 222호를 발표하는 것이다. 고객들을 가르는 아니라 함께 1.0 H. C. # 1225 P. C. H. P. # 1.0 H. C. # 1.0 H. P. # 1.0 H.
Figure/ No./	[발생물 : 12] 10 10 10 10 10 10 10 10 10 10 10 10 10
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Table Editorial	Description of Change
[17] 그는 수는 말을 하는데 되고 [17] 수는 수는 사이스 얼마나 다	1. 그렇게 되었다. 그렇게 그렇게 외국적의 중에는 경험에 되었던 그가는 말했던 아니라의 "경험되는 그리는 그는 이 소식의 방에게 된다고 되었다. 그렇게 모모였다.

Section	Editorial	2 nd paragraph, 3 rd sentence – changed "are held in place by stainless steel covers" to ",			
7.2.2		and the stainless steel covers are held in place by weld posts attached to the fuel			
		tubes"; 4 th sentence – deleted "metal matrix"			
		3 rd paragraph, 1 st sentence – changed "backfilled with helium" to "helium backfilled";			
		last sentence – changed "reached" to "generated"			
Section 7.3	Editorial	1 st paragraph, 1 st sentence – changed "accident conditions of storage" to "accident			
		events of storage"; 2 nd sentence – changed "accident conditions of storage" to			
		"accident events of storage"			
Chapter 8					
Section 8.1	7-3 &	1 st paragraph – deleted "TSC" from 1 st two lines of components & fabrication			
	Editorial	materials; added Closure Ring to list of components & fabrication materials; deleted			
		"/304L dual-certified" from Port Covers row			
	ĺ	Note below 1 st paragraph – changed "SA182 Type 304/304L" to "SA182 Type F304"			
		& changed "SA240 Type 304/304L" to "SA240 Type 304"			
		2 nd paragraph – changed "Mounting Bolts and Washers" to "Mounting Bolts";			
		changed "Gr B8 stainless steel" to "Gr B6 stainless steel" for Mounting Bolt; added			
		"Borated Aluminum Alloy, or Boral" to Neutron Absorber materials			
Section	Editorial	1 st paragraph, 2 nd sentence – changed "Subsection NG, Article NG-2300" to			
8.1.1	· ·	"Subsection NB, Article NB-2311"; 2 nd paragraph, 2 nd sentence – changed			
	į.	"Subsection NG-2320" to "paragraph NG-2320"; 4th sentence – changed "Table NG-			
		2331 (a)-1" to "Table NG-2331(a)(1)"			
Table 8.3-1	8-13	Note following table, 1 st sentence – revised throughout			
Table	3-1	Revised table throughout & added footnote c			
8.3-10					
Table	3-1	1 st row, 1 st column – deleted reference to footnote e;			
8.3-12		last row, 1 st column – deleted reference to footnote d			
Table	8-12	Revised temperature header to, "Values at Temperature (°F)";			
8.3-14		Revised footnote on Modulus of Elasticity value, 3.72, to be ^b ;			
		Revised units for Density to (lb/ft ³)			
Table	8-12	Revised Temperature heading to include units, (°F);			
8.3-16		Removed "e" from Property heading;			
		Revised Property list to Ultimate Tensile Strength and added footnote "e";			
	•	Revised Property list to Yield Strength and added footnote "e";			
		Added footnote "f" to Elongation in 2 inches, %, Modulus of			
		Elasticity, Coefficient of Thermal Expansion, Poisson's Ratio,			
		and Density;			
		Added footnote "f" to the listing of footnotes as: f ASME			
		Boiler and Pressure Vessel Code, Section II, Part D[5];			
		Added two additional lines in the table: Boral Core Modulus of			
		Elasticity, E (psi) = 1000 (assumed) for all temperatures; Boral Core Yield			
		Strength, S_v (psi) = 10 (assumed) for all temperatures.			
Table	Editorial	Replaced thermal conductivities table with PWR & BWR conductivities table			
8.3-22					
Table	8-6	Table 8.3-26 footnote for emissivity is changed from "c" to "b"			
8.3-26					

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Chapter/	RAI				
Section/	Response				
1898 Oct. 1898 Apr. 2019 (1998)	Property of the second second				
Figure/	No./				
Table	Editorial		Des	scription of Change	
		· 第二十二次2世紀 [1] · [1] 第三十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二十二		항상 교통하다 발생하는 그 사람들은 사람들이 살아.	지 않는데 이 화를 맞고 있다면 하고 가를 보고 있다. 그 그 점점이다.

Section 8.4	8-14	Added two sentences at the end of the 2 nd paragraph to specify the weld filler metals	
	Editorial		
Section 8.5	Editorial	2 nd paragraph, 1 st sentence – changed "Gr B8" to "Gr B6";	
(page		4 th sentence – deleted "analyzed"	
8.5-1)		Moved the last paragraph of this section (previously on page 8.5-2) to be the 3 rd	
		paragraph of this section (now on page 8.5-1)	
		4 th paragraph, 1 st sentence – deleted "wall"	
		5 th paragraph – deleted previous 3 rd & 4 th sentences	
		6 th paragraph – revised throughout	
Section 8.5	Editorial	1 st full paragraph – revised throughout	
(page		2 nd paragraph – added new text	
8.5-2)		4 th paragraph, last sentence – added "under the evaluated loading conditions"	
Section 8.6	Editorial	1st sentence – added "exposed surfaces of" & made into 2 sentences by adding "The	
		coatings are provided"	
Section	Editorial	1 st paragraph, 1 st sentence – deleted "Both"	
8.6.1		2 nd paragraph – added last sentence	
Section	1-7	2 nd paragraph, 2 nd sentence – deleted "or transport cask";	
8.6.2	Editorial	3 rd sentence – deleted "for TSC transfer"	
	•	3 rd paragraph, 2 nd sentence – added "coating"	
Section	Editorial	1 st paragraph, 3 rd sentence – added reference [33]	
8.7.1			
Section 8.8	8-8, 8-9,	Section rewritten, including terminology definitions. Added Table 8.8-1, Neutron	
_	8-10, 8-11	Absorber Material Minimum ¹⁰ B Loading, at the end of the section.	
Section 8.9	Editorial	2 nd paragraph, 1 st sentence – added "/construction"	
Section	Editorial	1 st paragraph, last sentence – changed reference fro "NRC Bulletin 96-04" to "ISG-	
8.10		15"	
Section	Editorial	4 th & 5 th sentences – revised throughout	
8.10.3			
Section	Editorial	3 rd full paragraph, 1 st sentence – deleted "under the closure lid"; last sentence –	
8.10.3.1		deleted "either" & added "argon"	
(page		Last paragraph, 2 nd sentence – changed "is attached to" to "accesses"; 3 rd sentence –	
8.10-6)		added "and TSC hydrostatic testing"	
Section	Editorial	2 nd paragraph, last sentence – revised throughout	
8.10.3.2			
Section	Editorial	1st sentence - changed "welding or cutting operations" to "closure lid welding or lid	
8.10.3.3		removal operations"	
Section	8-1	Inserted definitions of intact fuel and damaged fuel at the beginning of the section	
8.11			
Section	8-1 & 8-2	Combined the first and second paragraphs and added a sentence addressing	
8.11		retrievability of the fuel and added a paragraph at the end of the section further	
		addressing retrievability of the fuel.	
Section	Editorial	Replaced reference number 10; added reference number 33	
8.12		•	

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Table Editorial	cription of Change	

Castian	Editorial	Replaced ASTM 29 with latest standard	
Section 8.13.6	Editorial	Replaced ASTM 29 with latest standard	
1			
(pages 8.13-15 -			
8.13-17)			
Chapter 9			
Section 9.1	1-7, 7-2 &	Revised to correct TSC process description.	
Section 9.1	9-2	Revised to correct 150 process description.	
Sections	4-6, 7-2,	Corrected loading procedure to add new steps for helium mass determination for	
9.1.1,	7-3, 9-1,	backfill, TSC hydro test, welding and NDE of secondary closure (confinement)	
9.1.2, &	9-2, 9-3	components, turning vacuum pump off, new values for vacuum drying limits,	
9.1.3		procedures for corrective actions in case of loss of annulus cooling, etc. Details follow.	
Section	Editorial	Step 7 – 1 st sentence – deleted "and"; 2 nd sentence – added "over the transfer cask"	
9.1.1	6-3	Added second, independent, check of assembly to meet the requirements of the	
		Technical Specifications into Step 15.	
	Editorial	Step 22 – added new last sentence	
		Step 23, 1 st sentence – added "radioactive"	
		Step 25, Note: – added "or an equivalent structure"	
		Step 29, 2 nd sentence – changed (+25°F)" to (+25, -50 °F)	
	,	Step 30 – revised throughout	
		Steps 49, 50 & 51 – added new text & renumbered subsequent steps (e.g., new step 52	
		is the old step 49, etc.)	
		Step 52 – revised throughout	
.	•	Step 56 – revised throughout	
		Step 60 - deleted acronym (VDS); 60a spelled out vacuum drying system; 60b	
		added 2 nd sentence; 60c. – 1 st sentence – added "and turn off the vacuum pump"; 2 nd	
		sentence – formerly part of 1 st sentence; added 2 new Notes	
		Step 61 – revised throughout	
		Step 62 - deleted acronym (PHD); 62a spelled out pressurized helium drying	
		Step 63 – revised throughout	
		Step 64 – revised throughout	
		Steps 67 & 68 – added new text & renumbered subsequent steps (e.g., new step 69 is	
		the old step 64, etc.)	
		Step 70, Note – revised throughout	
		Step 74 – added new text	
Section 9.1.2	Editorial	Step 16 – added new second Note	
Section	Editorial	Clarified concrete cask spacing requirement in Step 16.	
9.1.3		Step 21 revised throughout.	
Tables	4-6, 7-2,	Added new tables	
9.1-3 &	7-3, 9-1,		
9.1-4	9-2, 9-3		
Section 9.2	1-7	1 st paragraph, 2 nd sentence – deleted "or a transport cask"	
		Last paragraph – deleted 2 nd sentence	

Chapter/ RAI		
Section/ Response		
Section/ Response		
Figure/ No./		
Figure/ No./		
	Description of Change	
Table Editorial		

Section 9.3	Editorial	Step 5 – added "outer and inner"
	8-3	Step 14 – added bounding maximum flow rate
	7-3	Step 21 – revised throughout
	7-3	Step 22 – added new text & renumbered subsequent steps
Chapter 10		Ab. 4b.
Section	7-3	Fabrication control (h) – added 6 th & 7 th sentences to address PT examination of
10.1.1		closure ring and redundant port covers
(page		
10.1-2)		
Section	Editorial	2 nd paragraph, 1 st sentence – added "be performed on the lugs independently of the
10.1.2.2		concrete cask and will"
Section	9-2	Revised to add new section on Pressure Testing of the TSC
10.1.2.3		
Section	Editorial	3 rd paragraph, 2 nd sentence – added "approximately"; added new 3 rd sentence
10.1.3		
Section	8-9, 8-10,	Completely revised the section to incorporate the requirements of the new DRAFT
10.1.6	8-11	ASTM standard for neutron absorbers.
(pages		
10.1-6 -		
10.1-16)		
Section	Editorial	Clarified requirements for inspection and repair of transfer cask coating
10.2.1 and		
Table		
10.2-1		
Section	Editorial	Added references 14 and 15.
10.3 (page		
10.3-2)		
Chapter 11		
Section	7-3 &	1 st bullet, 1 st sentence – deleted "used" & added "closure ring, and port covers"; 2 nd
11.1.3	Editorial	bullet – added "and closure ring"
Section	Editorial	Added last sentence to identify the use of conservative heat loads
11.3.2		
Tables	5-7	Updated dose rates due to heat load reduction and exposures times for lid closure
11.3-1,		(closure ring, dual port covers).
11.3-2		
Chapter 12		
Section 12	Editorial	2 nd paragraph, 1 st sentence – changed "rigorous" to "severe"
Section	Editorial	Deleted "a daily"
12.1.1.2		
Section	Editorial	Changed "steady-state condition is" to "steady-state conditions are"
12.1.1.3		1 st paragraph – revised table throughout
Section	Editorial	1 st sentence – added "if measured"
12.1.2.2		
Section	Editorial	2 nd paragraph – revised table throughout
12.1.2.3	Lanonai	2 paragraph 1011000 more anoughtout
14.1.4.7		L

Chapter/ RAI		
Section/ Response		
Figure/ No./		
Table Editorial	Description of	f Change

		•
Section	5-2	2 nd , 4 th & 5 th sentences – revised to reflect licensing dose rates
12.1.2.5		
(Pages		
12.1-3 &		
12.1-4)		
Section	Editorial	1 st full paragraph, last sentence – revised minimum factors of safety for the TSC and
12.1.3.3		the fuel basket from "1.45 and 2.95" to "1.28 and 1.07"
(page		
Section	Editorial	1 st partial paragraph – combined former 2 nd paragraph with 1 st paragraph & deleted 1 st
12.1.4.3	Editorial	sentence from former 2 nd paragraph; new 2 nd paragraph, 1 st sentence – added "the
(page		optional"
12.1-6)		optional
Section	Editorial	1st sentence – changed "steps" to "operations and measures" & added ", to the extent
12.1.5		practical,"; 2 nd sentence – added "or flat"
Section 12.1.5.2	Editorial	1 st sentence – added "contamination"
Section 12.2	Editorial	2 nd paragraph, 1 st sentence – changed "classes" to "lengths" in 2 places
Section	2-3	1 st paragraph, 3 rd sentence – changed "246 psig (PWR) and 195 psig (BWR)" to "201
12.2.1.3		psig (PWR) and 158 psig (BWR)";
	,	last sentence – revised minimum factor of safety for the TSC stresses from "1.75" to
		"1.59"
Section	Editorial	4 th paragraph, last sentence – revised minimum margin of safety for the TSC stresses
12.2.4.3		from "1.75" to "3.60"; 5 th paragraph, last sentence – revised the factor of safety
		against buckling from "3.8" to "4.1"
Section	Editorial	Last sentence – revised throughout
12.2.4.4	T) 11. 1 1	st , 11 1 (, 3)
Section 12.2.6	Editorial	1 st sentence – added "storage"
Section	4-5	1 st paragraph, 6 th sentence – changed "675°F." to "700 °F,"
12.2.6.3	Editorial	2 nd paragraph, 1 st sentence – added "safe"
Section	Editorial	2 nd sentence – added "exterior surfaces of the" & "visually";
12.2.6.4		last sentence – revised throughout
Section	Editorial	1 st paragraph – revised table throughout
12.2.7.3		J. T. C. T. T. T. C. T. T. C. T.
Section	Editorial	Revised throughout
12.2.8.3		
Section	Editorial	1 st sentence – added "the array"; added new 3 rd sentence
12.2.9.3		
Section	Editorial	3 rd sentence – revised throughout; last sentence – added "cask bulk"
12.2.10.3		
Section	Editorial	Added "array of the concrete"
12.2.10.4		
Section	Editorial	1st sentence – changed "concrete casks on" to "concrete cask array at"
12.2.11.4		

Chapter/ Section/ Figure/ Table	RAI Response No./ Editorial	Description of Change	
<u> </u>			
Section 12.2.11.5 (page 12.2-16)	5-3, 12-1	Added text addressing top missile impact on exposure and clarified bounding nature of radial dose evaluation.	
Section 12.2.12	Editorial	2 nd & 3 rd paragraphs – revised throughout	
Section 12.2.12.1	Editorial	2 nd sentence – changed "are expected to result" to "will result"	
Section 12.2.12.3 (page 12.1-17)	Editorial	2 nd full paragraph, 2 nd sentence – added "thicknesses"	
Section 12.2.12.4 (pages 12.2-17 & 12.2-18)	12-2	Revised to include an evaluation for the radiological impact from a cask tip-over on the concrete pad	
Section 12.2.12.5 (page 12.2-18)	Editorial	1 st paragraph, 1 st sentence – added "shielding or"	
Section 12.2.12.5 (page 12.2-19)	Editorial	1 st partial paragraph, 1 st full sentence – added "at the earliest possible time" 2 nd paragraph – changed "must be" to "should be"	
Section 12.2.13	Editorial	2 nd sentence – deleted "either"; changed "design basis limit" to "accident internal pressure limit"	
Section 12.2.13.2 (pages 12.2-19 & 12.2-20)	Editorial	Added new 2 nd sentence	
Section 12.2.13.3	Editorial	4 th sentence – added "thermal model"; 7 th sentence – added "maximum"; last sentence – revised throughout	
Section 12.2.13.4	Editorial	1 st sentence – revised throughout	
Section 12.2.13.5	Editorial	Revised throughout	
Section 12.3	Editorial	Removed dates from references 2 & 3	

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Table Editorial	Description of Change

Chapter 13		
13A	2-3	Added burnup definition
Section 1.1	8-1, 13-2	Added definitions of Damaged Fuel and Intact Fuel
	1-7	Deleted "or to a TRANSPORT CASK" from definition of TRANSFER
		OPERATIONS
	Editorial	Combined definitions of TRANSPORTABLE STORAGE CANISTER and TSC and
		revised for clarity
13A –	6-6, 13-4	Revised the referenced ("controlled") Chapter 6 tables to be 6.4-1 and 6.4-2.
Section 2.1		
13A	6-6, 13-4	In two places, revised the referenced ("controlled") Chapter 6 tables to be 6.4-1 and
Section 2.2		6.4-2.
13A – LCO	7-2	Changed "pressure" to "density" in 2 places
3.1.1,		
Cond. B		
13A - SR	9-1	Revised to require vacuum pump be turned off during dryness verification.
3.1.1.1		
13A - SR	7-2	Revised to incorporate additional instructions for backfilling the TSC with a specified
3.1.1.2		mass of helium including adding a new Table 3-1 (see next item).
Table 3-1	13-1	Added new table to identify the required density of helium for a TSC containing
		design basis heat load contents. Deleted old Table 3-1.
13A –	13-3	Frequency revised to: Once within 4 hours AND Every 24 hours
SR 3.2.1.1		
13A –	8-8	Replaced Item a) text with a tabulation of the minimum ¹⁰ B loading in the neutron
Section		absorber materials
4.1.1 a)		
13A –	Editorial	3 rd paragraph – deleted "(1997)" and "(1995)"
Section 4.2		
13A –	Editorial	4 th paragraph, 1 st sentence – deleted "(1997)" and "(1995)"
Section 4.4		
13A -	Editorial	Deleted 2 nd bullet (formerly b.), since the annulus cooling system is no longer a
Section		mandatory system.
5.1.2		New 2 nd bullet – added "and/or measurement"
		New 3 rd bullet – revised throughout
		New 4 th bullet – revised throughout
		New 5 th bullet – revised throughout
13A –	Editorial	3 rd sentence – changed "equipment operability and equipment lift height" to
Section		"equipment operability and lift heights"; 4th sentence – changed "if necessary" to "as
5.1.3		necessary"
13A –	Editorial	2 nd paragraph – added "the following"
Section		
5.1.4		
13B	2-3	Revised terms where needed from burnup to assembly average burnup
13B -	Editorial	Third bullet revised to say, "Within 60 days,
Section 1.0		
13B -	13-4, 13-5	Revised sentence to include Tables 2-1 through 2-17 and Tables 6.4-1 and 6.4-2 of the
Section 2.0	·, ·	FSAR
		I THE I

Chapter/	RAI	
Section/	Response	
Figure/ Table	No./ Editorial	Description of Change
	T-10-1-	
13B ~	13-6, 13-7	Revised item I.A.1 to say, "Uranium PWR INTACT FUEL ASSEMBLIES listed in
Table 2-1		Tables 2-2 and 2-3 and meeting the following specifications:"
ĺ		Revised throughout to reflect assembly average burnup
		Revised item I.C, second sentence to say, "Assemblies may contain solid filler rods
13B -		that displace a volume equal to, or greater than, that of the original fuel rod." Revised decay heat per assembly to reflect new heat load and burnup limits. Limited
Tables 2-2		assembly average burnup to 60 GWd/MTU. Added peak rod burnup limit
& 2-9		assembly average outhup to 00 G warvit 0. Added peak for burnup innit
13B -	13-5	Inserted second note, "Specific fuel characteristics are defined in Table 6.4-1 of the
Table 2-3	13 3	FSAR."
13B -	13-5	CEA column revised throughout; revised note
Table 2-4		
13B -	13-5	Maximum Heat Load column revised throughout
Table 2-7		
13B -	13-6	Inserted "I." before BWR FUEL (editorial)
Table 2-8		Revised item I.A.1 to say, "Uranium BWR INTACT FUEL ASSEMBLIES listed in
]		Tables 2-9 and 2-10 and meeting the following specifications:"
		Revised throughout to reflect assembly average burnup
13B -	13-5	Inserted note, "Specific fuel characteristics are defined in Table 6.4-2 of the FSAR."
Table 2-10		Revised to indicate the number of partial length rods and refer to sketch of partial rod
		locations
13B -	Editorial	Inserted "2.3" that was inadvertently omitted previously
Table 2-11		D : 170 11 0 10 0 14 0 0 15 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
13B – Tables	2-3	Revised Tables 2-13, 2-14 & 2-15 to incorporate current PWR heat loads and burnup
2-13 - 2-17		limits. Inserted Table 2-16 for current PWR heat load and moved previous BWR loading table to Table 2-17 for current BWR heat load and burnup limits
13C,	Editorial	Approved Contents, 3 rd sentence – added "and nonfuel assembly hardware"
Section 2.1	Lanonai	Approved Contents, 5 sentence – added and nonruel assembly naturale
13C,	Editorial	Approved Content Limits and Violations, 2 nd paragraph, 2 nd sentence – changed "30
Section 2.1	Dantona	days" to "60 days"
13C, LCO	7-2, 9-1,	Major revision to add information regarding turning off vacuum pump, hydrotesting
3.1.1	9-2, 13-1	the cavity and backfilling the TSC with a calculated mass of helium
13C,	Editorial	Backgound, 2 nd paragraph – revised throughout; 3 rd paragraph, 1 st sentence – added
Section		"during the loading and TSC preparation up through the draining of the cavity water"
3.2.1		
13C -	13-3	Changed "eight" to "four" in five places.
SR 3.2.1.1		Revised 2 nd sentence in 2 nd paragraph to read, "based on the potential for boron
(pages		dilution to occur prior to the start of loading"
13C-19 -		Changed "48" to "24" in third paragraph.
13C-20)	<u> </u>	Added new last sentence to last paragraph
Chapter 14	Editorial	Revised NAC Functional Organization Chart throughout
Figure 14.1-1		Revised 14AC Functional Organization Chart unoughout
Section	Editorial	Revised references 1 & 3 for consistency
14.2	20101141	Training rater and a for actions and
Throughout	Editorial	Miscellaneous minor editorial revisions for accuracy and consistency.
		The state of the s

Chapter/ RAI Section/ Response		
Figure/ No./ Table Editorial	Description of Ch	ange

Chapter 15		
Section 15	Editorial	1 st paragraph, 2 nd sentence – deleted "However"; changed "site" to "onsite"; 3 rd sentence – added "direct" 2 nd paragraph, 1 st sentence – added "to the environment"
Section 15.1	Editorial	3 rd paragraph, last sentence – changed "low specific activity material" to "Surface Contaminated Objects (SCO) or Low Specific Activity (LSA) material"
Section 15.2	8-2	Revised first sentence of the section to address fuel retrievability requirements.
Section 15.2	15-1	Incorporated instructions for surveying for fuel particulates of TSC internals prior to disposal.
	Editorial	3 rd paragraph, 2 nd sentence – changed "low specific activity waste" to "SCO or LCA waste"
Table 15.2-1	Editorial	3 rd row under header, 4 th column – deleted "#N/A"
Section 15.3	2-1	Added ISG-2 as Reference No. 2. and 10 CFR 72 as Reference No. 3.



Attachment 2

List of Drawing Changes

for

MAGNASTOR Amendment & RAI Responses Revision 05A

NAC International

September 2005



Drawing 71160-551, Revision 2 - Fuel Tube Assembly, MAGNASTOR - 37 PWR

- Revised Assemblies 99 and 98.
- Added new section views and details.
- Added new Item 12 to BOM Name: Mounting Boss; Material: Carbon Steel; Spec: See Note 4; Description: Bar.
- Deleted Items 6 and 11 (corner clip) and updated accordingly throughout the drawing.
- Deleted Delta note 5 and removed all related delta graphics.
- Revised quantity for Item 7 (weld post) Assy 99: IS)144; WAS) 72; for Assy 98: IS) 136; WAS) 72.
- Revised cut-out length on Sheet 1, Zone E5, to accept pin: IS) (3.5) Typ; WAS) (2.2) Typ.

<u>Drawing 71160-561, Revision 3 – Structure, Weldment, Concrete Cask, MAGNASTOR</u>

- Changed dimension Sht 1 of 4, Zone D6: IS) (6.7 Typ); WAS) 6.70 Typ.
- Changed dimension Sht 1 of 4, Zone D6: IS) (4.5 Typ); WAS) 4.45 Typ.
- Changed dimension Sht 3 of 4, Zone D8: IS) (3x Ø.63) EQ. SPACED; WAS) 3x Ø.63, EQ. SPACED.
- Added dimensions to Assy -94 & -95 to show dia. of lifting hole (Ø4.1) and location from top radius (3.8).
- Changed BOM Item 14 description: IS) 3 x 7 1/2 S-BEAM; WAS) S-BEAM.
- Added Note 10.
- Added Item 39 to BOM QTY for 93: A/R; Name: Concrete; Spec: Coml; Descrption: See Note 10.
- Revised Section D-D, Sheet 3, Zone B6.

<u>Drawing 71160-571, Revision 2 – Details, Neutron Absorber, Retainer, MAGNASTOR – 37 PWR</u>

Revised Items 1, 2, 3 and 4 to enhance fabrication.

<u>Drawing 71160-572, Revision 2 – Details, Neutron Absorber, Retainer, MAGNASTOR – 87 BWR</u>

• Revised Items 1, 2, 3 and 4 to enhance fabrication.



Drawing 71160-574, Revision 2 - Basket Support Weldments, MAGNASTOR - 37 PWR

- Added Ø1.5 dimension for Items 2 and 3 on Sheet 1, Zone E7. Also added "(20.0) Typ" spacing of holes and updated graphics accordingly.
- Added Ø1.5 dimension for Items 8 and 9 on Sheet 2, Zone E4.
- Revised weld callout for Item 1 to Items 2 and 3, Sheet 1, Zone D6: IS) (1/4) groove weld, both sides, Typ, VT; WAS) 1/8 groove weld, both sides, Typ, VT.

Drawing 71160-575, Revision 2 - Basket Assembly, MAGNASTOR - 37 PWR

- Revised Item 18 (mounting bolt) description: IS) 5/8-11 UNC; WAS) blank.
- Added Detail D-D.
- Revised Item 18 (mounting bolt) Spec: IS) B6; WAS) B8.

Drawing 71160-581, Revision 2 - Shell Weldment, Canister, MAGNASTOR

- Revised length for Assemblies 99 and 97: IS) (191.8); WAS) (191.3).
- Revised length for Assemblies 98 and 96: IS) (184.8); WAS) (184.3).

Drawing 71160-584, Revision 2, Details, Canister, MAGNASTOR

- Added Item 5 to the BOM Name: Closure Ring; Material: 304 St. Stl.; Spec: ASME SA 276; Description: Bar.
- Added graphics for Item 5 (closure ring).

Drawing 71160-585, Revision 2, TSC Assembly, MAGNASTOR

- Revised BOM.
- Added Delta note.
- Revised assembly callout on Sheet 2 to include Assemblies 95 and 94.
- Revised Detail A-A to include Item 16 (closure ring) and updated graphics of main TSC Assembly.
- Added Detail B-B showing stacked port covers and updated graphics of main TSC Assembly.
- Added balloon callout for Items 14 and 15 to balloon callouts 1, 2, 11 and 12.
- Added Assembly numbers 95 and 94 to the appropriate dimension on the overall dimension of the TSC Assemblies.
- Changed Delta note 4 to read, "PT final surface."



Drawing 71160-590, Revision 3, Loaded Concrete Cask, MAGNASTOR

Updated to provide dimensions and locations of the air inlets and air outlets.

Drawing 71160-591, Revision 2, Fuel Tube Assembly, MAGNASTOR - 87 BWR

- Revised Assemblies 99 and 98.
- Added new section views and details.
- Deleted Items 3 and 4 (corner clip) and updated accordingly throughout the drawing.
- Deleted Delta note 5 and removed all related delta graphics.
- Revised quantity for Item 11 (weld post) Assy 99: IS) 84; WAS) 16; for Assy 98: IS) 80; WAS) 16.
- Added Item 12 to the BOM Name: Bottom Plate; Material: Carbon Steel; Spec: ASTM A537, CL1; Description: Plate. Added detail for Item 12. Applied Item 12 balloon callouts accordingly throughout the drawing.
- Added a seal weld typical to the bottom of the Fuel Tube Assembly joining flush with Item 12 (bottom plate) Sheet 1, Zone E1. Showed cut view for clarity.
- Revised BOM to accommodate Assemblies 97 and 96.
- Added Assemblies 97 and 96 callout.

Drawing 71160-598, Revision 3, Basket Support Weldments, MAGNASTOR - 87 BWR

- Revised BOM.
- Added Delta note 6.
- Revised weld callouts for Assemblies 99 and 98 (corner support weldment).
- Added Assemblies 95 and 94 (corner support weldment drain) and Assemblies 93 and 92 (corner support weldment – vent).
- Revised Assemblies 97 and 96 (side support weldment) overall width: IS) (17.4); WAS) (17.5).
- Revised Assemblies 99 and 98 (corner support weldment) overall width IS) (34.7); WAS) (34.8).
- Added hole callout for Assemblies 99 and 98 diameter is: (Ø1.6) Typ. Also added "(20.0) Typ" to hole spacing and updated graphics accordingly.
- Added hole callout for Assemblies 95 and 92 diameter is: (Ø 1.6) Ty
- Added hole callout for Assemblies 97 and 96 diameter is: (Ø 1.3) Typ. Also added "(20.0) Typ" to hole spacing and updated graphics accordingly.



<u>Drawing 71160-599, Revision 2, Basket Assembly, MAGNASTOR – 87 BWR</u>

- Revised BOM.
- Added notes for clarity.
- Revised Section B-B on Sheet 3 to show Corner Support Weldment Drain.
- Updated View A-A on Sheet 2 to show new Corner Support Weldment Vent and Drain.
- Added detail for Items 19 and 32.
- Revised Section B-B on Sheet 3 to show correct placement for Items 18 and 19 to Items 20 and 21, and the same for Items 31 and 32 to Items 22 and 23.
- Added Detail E-E.



Attachment 3

List of

NAC MAGNASTOR PROPRIETARY INFORMATION CALCULATION PACKAGES AND FUEL ASSEMBLY DESCRIPTION DOCUMENTS

NAC International

September 2005



<u>List of NAC MAGNASTOR Proprietary Information Calculation Packages and Fuel Assembly Description Documents</u>

- 71160-3025, "NewGen VCC/PWR Canister Thermal Evaluation with Increased Flow Resistance," Revision 0.
- 71160-3026, "NewGen VCC/BWR Canister Thermal Evaluation with Increased Flow Resistance," Revision 0.
- 71160-3027, "Determination of Flow Resistances for PWR and BWR Fuel Assemblies," Revision 0.
- 71160-3028, "Benchmark for the Turbulence Model for the Annulus Flow," Revision 0.
- 71160-5051, "NewGen Storage Cask Occupational Exposure Evaluation," Revision 1.
- 71160-5052, "NewGen Transfer Cask Occupational Exposure Evaluation," Revision 2.
- 71160-5061, "NewGen PWR Skyshine Analysis, " Revision 1.
- 71160-5062, "NewGen BWR Skyshine Analysis," Revision 1.
- "A Comparison of Skyshine Computational Methods," Hertel, Nolan E. et al, not for public release (accepted to be published in Radiation Protection Dosimetry, November 2005)
- EA790-4003, "PWR and BWR Enveloping Fuel Assembly Physical Descriptions, "Revision 1, NAC-UMS Calculation Package
- EA792-5001, "PWR and BWR Enveloping Fuel Assembly Descriptions for Nuclear Analysis," Revision 1, NAC-UMS Calculation Package
- Sub-array and Grid Information for the SVEA-96 Fuel Assembly Type, UMS Additional Information, Enclosure 9, Pages 48 and 49, submitted to the NRC on September 4, 1998
- "Fuel Assembly Data for Cask Designs," Report No. E00-19, Revision 0, Stoller Nuclear Fuel, October 16, 2000



NAC INTERNATIONAL AFFIDAVIT PURSUANT TO 10 CFR 2.390

Thomas A. Danner (Affiant), Vice President, Engineering, of NAC International, hereinafter referred to as NAC, at 3930 East Jones Bridge Road, Norcross, Georgia 30092, being duly sworn, deposes and says that:

- 1. Affiant has reviewed the information described in Item 2 and is personally familiar with the trade secrets and privileged information contained therein, and is authorized to request its withholding.
- 2. The information to be withheld includes the following NAC calculation packages and fuel assembly description documents that are being provided in support of the technical review of NAC's request for approval of the NAC MAGNASTOR System.
 - 71160-3025, "NewGen VCC/PWR Canister Thermal Evaluation with Increased Flow Resistance," Revision 0.
 - 71160-3026, "NewGen VCC/BWR Canister Thermal Evaluation with Increased Flow Resistance," Revision 0.
 - 71160-3027, "Determination of Flow Resistances for PWR and BWR Fuel Assemblies," Revision 0.
 - 71160-3028, "Benchmark for the Turbulence Model for the Annulus Flow," Revision 0.
 - 71160-5051, "NewGen Storage Cask Occupational Exposure Evaluation," Revision 1.
 - 71160-5052, "NewGen Transfer Cask Occupational Exposure Evaluation," Revision 2.
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 - 71160-5062, "NewGen BWR Skyshine Analysis," Revision 1.
 - "A Comparison of Skyshine Computational Methods," Hertel, Nolan E. et al, not for public release (accepted to be published in Radiation Protection Dosimetry, November 2005)
 - EA790-4003, "PWR and BWR Enveloping Fuel Assembly Physical Descriptions,"
 Revision 1, NAC-UMS Calculation Package
 - EA792-5001, "PWR and BWR Enveloping Fuel Assembly Descriptions for Nuclear Analysis," Revision 1, NAC-UMS Calculation Package
 - Sub-array and Grid Information for the SVEA-96 Fuel Assembly Type, UMS Additional Information, Enclosure 9, Pages 48 and 49, submitted to the NRC on September 4, 1998
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The subject calculation packages and fuel assembly description documents include detailed analysis methods and results and fuel assembly data that have been developed or have been obtained under proprietary agreement by NAC and are being used for the NAC MAGNASTOR System.

NAC is the owner of the information in the calculation packages. NAC has entered into agreements to maintain the fuel assembly description documents as proprietary information. The Radiation Protection Dosimetry paper is original presentation material not yet published-NAC is maintaining the authors' privacy rights. Thus, all of the above identified information is considered NAC Proprietary Information.



NAC INTERNATIONAL AFFIDAVIT PURSUANT TO 10 CFR 2.390 (continued)

- 3. NAC makes this application for withholding of proprietary information based upon the exemption from disclosure set forth in: the Freedom of Information Act ("FOIA"); 5 USC Sec. 552(b)(4) and the Trade Secrets Act; 18 USC Sec. 1905; and NRC Regulations 10 CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial financial information obtained from a person, and privileged or confidential" (Exemption 4). The information for which exemption from disclosure is herein sought is all "confidential commercial information," and some portions may also qualify under the narrower definition of "trade secret," within the meanings assigned to those terms for purposes of FOIA Exemption 4.
- 4. Examples of categories of information that fit into the definition of proprietary information are:
 - a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by competitors of NAC, without license from NAC, constitutes a competitive economic advantage over other companies.
 - b. Information that, if used by a competitor, would reduce their expenditure of resources or improve their competitive position in the design, manufacture, shipment, installation, assurance of quality or licensing of a similar product.
 - c. Information that reveals cost or price information, production capacities, budget levels or commercial strategies of NAC, its customers, or its suppliers.
 - d. Information that reveals aspects of past, present or future NAC customer-funded development plans and programs of potential commercial value to NAC.
 - e. Information that discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information that is sought to be withheld is considered to be proprietary for the reasons set forth in Items 4.a, 4.b, and 4d.

- 5. The information to be withheld is being transmitted to the NRC in confidence.
- 6. The information sought to be withheld, including that compiled from many sources, is of a sort customarily held in confidence by NAC, and is, in fact, so held. This information has, to the best of my knowledge and belief, consistently been held in confidence by NAC. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements, which provide for maintenance of the information in confidence. Its initial designation as proprietary information and the subsequent steps taken to prevent its unauthorized disclosure are as set forth in Items 7 and 8 following.



NAC INTERNATIONAL AFFIDAVIT PURSUANT TO 10 CFR 2.390 (continued)

- 7. Initial approval of proprietary treatment of a document/information is made by the Vice President, Engineering, the Project Manager, the Licensing Specialist, or the Director, Licensing the persons most likely to know the value and sensitivity of the information in relation to industry knowledge. Access to proprietary documents within NAC is limited via "controlled distribution" to individuals on a "need to know" basis. The procedure for external release of NAC proprietary documents typically requires the approval of the Project Manager based on a review of the documents for technical content, competitive effect and accuracy of the proprietary designation. Disclosures of proprietary documents outside of NAC are limited to regulatory agencies, customers and potential customers and their agents, suppliers, licensees and contractors with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- 8. NAC has invested a significant amount of time and money in the research, development, engineering and analytical costs to develop the information that is sought to be withheld as proprietary. This information is considered to be proprietary because it contains detailed descriptions of analytical approaches, methodologies, technical data and evaluation results not available elsewhere. The precise value of the expertise required to develop the proprietary information is difficult to quantify, but it is clearly substantial.
- 9. Public disclosure of the information to be withheld is likely to cause substantial harm to the competitive position of NAC, as the owner of the information, and reduce or eliminate the availability of profit-making opportunities. The proprietary information is part of NAC's comprehensive spent fuel storage and transport technology base, and its commercial value extends beyond the original development cost to include the development of the expertise to determine and apply the appropriate evaluation process. The value of this proprietary information and the competitive advantage that it provides to NAC would be lost if the information were disclosed to the public. Making such information available to other parties, including competitors, without their having to make similar investments of time, labor and money would provide competitors with an unfair advantage and deprive NAC of the opportunity to seek an adequate return on its large investment.

STATE OF GEORGIA, COUNTY OF GWINNETT

Mr. Thomas A. Danner, being duly sworn, deposes and says:

Executed at Norcross, Georgia, this 29th day of September 2005.

That he has read the foregoing affidavit and the matters stated herein are true and correct to the best of his knowledge, information and belief.

Thomas A. Danner
Vice President, Engineering
NAC International
Subscribed and sworn before me this 29th day of Lepterber, 2005

Notary Public