

PMSTPCOL PEmails

From: Foster, Rocky
Sent: Tuesday, August 23, 2011 4:36 PM
To: STPCOL
Subject: FW: NINA Open Items Telecom Agenda for August 24, 2011
Attachments: OI list_8-24-11.pdf; BNL Initial Feedback 06-23 and 8-3-11 RAI Responses - Updated on 081711.docx; draft RAI 5987.docx

From: Foster, Rocky
Sent: Tuesday, August 23, 2011 5:37 AM
To: Abeywickrama, Bernadette; 'Chappell, Coley'; 'wemookhoek@stpegs.com'; 'Head, Scott'; 'jeprice@stpegs.com'; 'Elton, Loree'; 'jaagles@stpegs.com'; Eudy, Michael; Tai, Tom; Chakrabarti, Samir; Wei, Xing; 'Morante, Richard J'; 'jbergman@curtisswright.com'
Cc: Wunder, George
Subject: NINA Open Items Telecom Agenda for August 24, 2011

Good Morning,

NOTE to Bernie: Please enter the Open Items Master List file (OI List_8-24-11.pdf) into ADAMS and provide the ADAMS accession number to Cheri Nagel and myself so as to be included in the meeting summary for August 24, 2011.

The NINA/STP Open Items telecom is schedule for August 24, 2011. The morning session is from 09:00 am to 11:00 am and the Chapter 3 afternoon session is from 2:00 pm to 3:00 pm.

This is a standing bridge line available every Wednesday from 09:00 am to 11:00 am through December 28, 2011.

Conference Line - 888-455-2563
Pass Code - 84624

09:00 am – 11:00 am Agenda:

- Chapter 9 draft RAI 5987 (attached)
- Continuation of Chapter 9 fuel rack structural review RAI responses discussion
- OI Master List (attached)
- Comments/Questions

For the August 24, 2011, Wednesday call, we do not have any Chapters 3.7/3.8 technical discussion because SEB2 staff is on vacation. Therefore, we'd like to start at 2:00 pm with EMB2. We can discuss any Chapters 3.7/3.8 administrative issues after the 2 pm call.

For those who are out of the office but want to participate on this call:

Conference Line - 866-803-2146
Pass Code - 7482641#

Agenda items:

From 2:00 pm to 3:00 pm – T-10C02:

1. Feedback on HCU spec review
2. Staff feedback on advanced copy of the response to RAI 5952 (ACSTIC2 V&V)
3. Status of RAI 5870 response (FMCRD spec)
4. Schedule of RAI responses to Chapter 3.9.2
5. Miscellaneous items

Thanks,

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Subject: FW: NINA Open Items Telecom Agenda for August 24, 2011
Sent Date: 8/23/2011 4:36:18 PM
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Files	Size	Date & Time
MESSAGE	2502	8/23/2011 4:36:19 PM
OI list_8-24-11.pdf	280676	
BNL Initial Feedback 06-23 and 8-3-11 RAI Responses - Updated on 081711.docx		
30575		
draft RAI 5987.docx	20254	

Options
Priority: Standard
Return Notification: No
Reply Requested: No
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2011 NINA/STP COLA Item Status Counts

OPEN	01/12/2011	01/19/2011	01/26/2011	02/09/2011	02/16/2011	02/23/2011	03/04/2011
NRC action	45	34	37	34	31	36	22
STP action	20	25	22	22	20	28	37
	65	59	59	56	51	64	59
CONFIRMATORY	01/12/2011	01/19/2011	01/26/2011	02/09/2011	02/16/2011	02/23/2011	03/04/2011
NRC action	2	2	2	2	2	2	2
STP Action	81	138	154	152	154	155	147
	83	140	156	154	156	157	149
CLOSED	01/12/2011	01/19/2011	01/26/2011	02/09/2011	02/16/2011	02/23/2011	03/04/2011
	53	92	92	95	101	101	116
OPEN	03/10/2011	03/16/2011	03/23/2011	03/30/2011	04/06/2011	04/13/2011	04/20/2011
NRC action	52	31	31	35	38	37	35
STP action	13	25	24	22	20	17	17
	65	56	55	57	58	54	52
CONFIRMATORY	03/10/2011	03/16/2011	03/23/2011	03/30/2011	04/13/2011	04/13/2011	04/20/2011
NRC action	2	2	2	2	2	2	2
STP Action	82	83	84	84	84	84	86
	84	85	86	86	86	86	88
CLOSED	03/10/2011	03/16/2011	03/23/2011	03/30/2011	04/06/2011	04/13/2011	04/20/2011
	116	118	118	118	118	122	124
OPEN	04/27/2011	05/04/2011	05/11/2011	05/18/2011	05/25/2011	06/01/2011	06/08/2011
NRC action	28	29	6	6	11	11	11
STP action	24	23	8	16	11	11	11
	52	52	14	22	22	22	22
CONFIRMATORY	04/27/2011	05/04/2011	05/11/2011	05/18/2011	05/25/2011	06/01/2011	06/08/2011
NRC action	2	2	2	2	2	2	2
STP Action	86	90	95	95	95	96	96
	88	92	97	97	97	98	98
CLOSED	04/27/2011	05/04/2011	05/11/2011	05/18/2011	05/25/2011	06/01/2011	06/08/2011
	124	124	124	124	124	124	124
OPEN	06/15/2011	06/22/2011	06/29/2011	07/06/2011	07/13/2011	07/20/2011	07/27/2011
NRC action	11	11	11	11	19	19	19
STP action	11	11	11	11	6	8	8
	22	22	22	22	25	27	27
CONFIRMATORY	06/15/2011	06/22/2011	06/29/2011	07/06/2011	07/13/2011	07/20/2011	07/27/2011
NRC action	2	2	2	2	2	2	2
STP action	96	96	96	96	96	96	96
	98	98	98	98	98	98	98
CLOSED	06/15/2011	06/22/2011	06/29/2011	07/06/2011	07/13/2011	07/20/2011	07/27/2011
	124	124	124	124	125	125	125

2011 NINA/STP COLA Item Status Counts

[illegible]

2011 NINA/STP COLA Item Status Counts

[illegible]

STP Phase 4 Open Items

Item #	Chp	OI #	RAI #	Description	Next Action	Next Action Completion Date	OI Closure Date	SER Completion Date	OI Status
1	1	1-1	n/a	Tier 1 Departure exemptions	NRC - exemption issuance (depends on completion of all other SER chapters and FEIS)(STP - To submit Technical Specification formal RAI response (16-71))	3rd Quarter 2011 and 8/30/2011		End of P4	open
5	1	1-5	(5856) 01-21	Financial Qualifications	NRC - RAI response review submitted on 8/4/11	09/04/2011		09/30/2011	open
6	1	1-6	3944 01-15	Parts 30, 40 and 70	STP - to update COL revision 6 w/ part 70 changes	08/30/2011		08/31/2011	open
39	3	3.7 and 3.8	3.7 and 3.8 RAIIs	3.7 and 3.8 Open Items and RAIIs being handled by Tom Tai during weekly breakout calls	STP/NRC				open
40A	3	03.09.01-1	03.09.01-1	ACSTIC2 V&V	NINA - provide adequate V&V package for ACSTIC2 and clarify ACSTIC2 versus ACSTIC2	08/18/2011			open
40	3	3.09.02-16	03.09.02-16 to -43 (5058)	Questions from the August 23-25, 2010 audit of WEC, SWE, Toshiba, and XGEN analyses	NRC - to review latest responses to RAI 5058 in 5/16/11	07/07/2011	07/07/2011		Closed
40B	3	03.09.02-21	03.09.02-21 (5058)	ACSTIC2 FSAR markup	NINA - include proposed FSAR changes in letter 110064 (4/13/2011) in next FSAR revision.				confirmatory
41	3	3.09.02-44	03.09.02-44 (5256)	Questions from the October 18-19 2010 audit of CVAP, including ACM methodology and license condition	NRC - to review latest response to 3.09.02-44 on 6/30/11	08/30/2011			Open
42	3	3.09.02-45	03.09.02-45 (5343)	Table 5.4 of FIV Stress Analysis Report of the Control Rod Guide Tube and Control Rod Drive Housing	NRC - to review responses to 3.09.02-45 on 2/28/11, and responses to RAI 5256 and 03.09.02-49 on 6/30/11	08/30/2011			confirmatory
43	3	3.09.02-46	03.09.02-46 (5343)	Tables 5.11 and 5.13 of FIV Stress Analysis Report of the High Pressure Core Flood Sparger and Coupling	NRC - to review responses to 3.09.02-46 on 2/28/11, and responses to RAI 5256 and 03.09.02-49 on 6/30/11	08/30/2011			confirmatory
44	3	3.09.02-47	03.09.02-47 (5343)	Section 2.2 of the FIV Stress Analysis Report of the Shroud	NRC - to review responses to 3.09.02-47 on 2/28/11, and responses to RAI 5256 and 03.09.02-49 on 6/30/11	08/30/2011			confirmatory
45	3	3.09.02-48	03.09.02-48 (5343)	STP steam dryer modal analysis and Japanese hammer test results	NRC - to review responses to 3.09.02-48 on 2/28/11, and responses to RAI 5256 and 03.09.02-49 on 6/30/11	08/30/2011			confirmatory

STP Phase 4 Open Items

Item #	Chp	OI #	RAI #	Description	Next Action	Next Action Completion Date	OI Closure Date	SER Completion Date	OI Status
46	3	3.09.02-49	03.09.02-49 (5343)	Sample pressure spectra on the sub-scale steam dryer	NRC - Review of revised technical reports submitted by STP on 6/30/11 to support review of FIV program (RAI 03.09.02-49 revised submittal on 6/30/11)	08/30/2011			open
47	3	3.09.02-50	03.09.02-50 (5343)	Sub-scale dryer pressure spectra compared to Japanese ABWR	NRC - to review responses to 3.09.02-50 on 2/28/11, and responses to RAI 5256 and 03.09.02-49 on 6/30/11	08/30/2011			confirmatory
48	3	03.09.04-1	03.09.04-1 (5870)	FMCRD spec load requirements	NRC - Review response submitted 8/15/11. Also provide feedback on HCU spec	08/31/2011			open
98	9	9.1.1-4	4561 (ltr 329), 09.01.01-4 5685 (ltr 377) issued with 8 supplemental questions	Basis for WCAP 17311 and 17331: Fuel rack structural analysis	STP - Supplemental RAI responses w/ final revision by 9/15/2011	09/15/2011			open
99	9	tbd	5685 (ltr 377) , 09.01.02-2	Descriptions of pools, racks and fuel-handling system	NRC - Review of RAI responses submitted on 6/23/11 (STP - Submit RAI response on Gaps & Tolerances topic on 9/15/11)	08/31/2011			open
100	9	tbd	5685 (ltr 377), 09.01.02-3	Fuel rack loads and load combinations	NRC - Review of RAI responses submitted on 6/23/11 (STP - Submit RAI response on NFR/SFR forces and stresses topic on 9/15/11)	08/31/2011			open
101	9	tbd	5685 (ltr 377), 09.01.02-4	Fuel drop analysis	NRC - Review of RAI responses submitted on 8/01/11	09/01/2011			open
102	9	tbd	5685 (ltr 377), 09.01.02-5	Fuel rack seismic modeling and analysis	NRC - Review of RAI responses submitted on 6/23/11 (STP - Submit RAI response items: c, g, i, j, m and n on 9/15/11)	08/31/2011			open
103	9	tbd	5685 (ltr 377), 09.01.02-6	Fuel rack design checks	NRC - Review of RAI responses submitted on 6/23/11 (STP - Submit RAI response items: b, c, d and e on 9/15/11)	08/31/2011			open
104	9	tbd	5685 (ltr 377), 09.01.02-7	Fuel rack quality assurance programs and quality control issues	NRC - Review of RAI responses submitted on 6/23/11	08/31/2011			open

STP Phase 4 Open Items

Item #	Chp	OI #	RAI #	Description	Next Action	Next Action Completion Date	OI Closure Date	SER Completion Date	OI Status
105	9	td	5685 (ltr 377), 09.01.02-8	Fuel rack thermal stress analysis	STP - RAI response on 9/15/2011	09/15/2011			open
106	9	td	5685 (ltr 377), 09.01.02-9	Fuel rack seismic loading	NRC - Review of revised RAI response and time history CD submitted on 8/17/11	09/01/2011			open
109	9	td	5540 (ltr 375), 09.04.03-2	Site Pspecific ITAAC and Tier 1 exemption for 99% charcoal filter efficiency	NRC - Review 3/31/11 response and supporting white paper submitted on 6/15/11. Staff review extended to 8/15/11.	08/15/2011			Closed
110	9	td	5540 (ltr 375), 09.04.03-3	Standard or Site Specific departure regarding charcoal efficiency design change	NRC - Review 3/31/11 response and supporting white paper submitted on 6/15/11. Staff review extended to 8/15/11.	08/15/2011			Closed

STP New and Spent Fuel Racks

RAI Responses Submitted 06/23/2011

Preliminary Review Comments/Requested Clarifications

(Prepared by R. Morante, X. Wei, BNL, 07/18/2011)

(Updated by R. Morante, X. Wei, BNL, 07/29/2011)

(Update by NRC, 08/10/2011)

On 06/23/2011, STP (the applicant) submitted responses to some of the staff's nine (9) RAIs submitted to the applicant on 05/09/2011. The applicant responded in accordance with the response schedule it had earlier submitted to the staff, with one (1) departure. The response to RAI 09.01.02-8 had been scheduled for 06/23/2011. In the applicant's 06/23/2011 response letter, the applicant deferred the response to RAI 09.01.02-8 until 09/15/2011.

Preliminary comments and requests for clarifications, related to the responses submitted, are noted below. Acceptance of a clarification does NOT constitute acceptance of the associated RAI response.

RAI 09.01.02-2 [NOTE: Response to part b. due on 09/15/2011.]

- (1) Clarification for Sketch 7 was provided during telecom on 07/13/2011. *(The two small vertical lines in the cell walls in Sketch 7 denote continuous butt welds to join the two pieces of channel cell walls together)*
- (2) Height of the leveling pad was discussed during telecom on 07/13/2011. STP will provide the height. *(Sketch 6, leveling Pad & Screw; the height of the leveling pad is 1.9")*
- (3) Clarification of welding of tie joints to the corners of adjacent cells on Sketch 14 was provided during telecom on 07/13/2011. *(The cell to cell welds are on one (either) side of the tie bar (joint). The tie bar (joint) is tapered to fit in the spacing between adjacent cells. Eccentricity of the welds is not considered in the calculation because it is small.)*
- (4) Clarify the following related to Sketch 13:
 - a. What is the material type of the 1/2" plates? How will they be attached to the rack? *(The 1/2" plates will be ASTM A240, TP304L. It is a continuous plate wrapping around the rack. It will be welded to the rack by 0.12" fillet welds, 4" long, on each cell, plate to be welded top & bottom, clarification to be provided in the WCAP update on 9/15/11)*
 - b. Have the loads from the linkage been considered in the fuel rack design? Are those loads treated as concentrated loads on cell walls? *(Not done yet, due 9/15/11)*
 - c. Have the design checks on the 1/2" plates and linkage been done? *(Not done yet, due 9/15/11)*

RAI 09.01.02-3 [NOTE: Response to part a. due on 09/15/2011.]

- (1) Clarification needed for the stuck fuel assembly calculation. Explain the basis for the assumptions used in calculating the axial forces that resist the moment at the bottom of the rack, caused by the horizontal force at the top of the rack. (*The calculation of the welding stress due to the axial forces that resist the moment is based on the assumptions that 1) two adjacent cells resist the entire moment at the base (a conservative assumption); 2) the axial force is applied uniformly on the four sides of the cell-to-baseplate welds to simplify the calculation, since the first assumption is conservative. The staff did a simple hand calculation considering a triangular stress distribution across the bottom of 2 adjacent cells. The results show that the maximum stress in the weld exceeds the allowable stress by 4%. Considering the conservative assumption noted in (1) above, the staff concludes that the stuck fuel assembly calculation is acceptable and the cell-to-baseplate weld is strong enough to resist the stuck fuel assembly loads.*)

RAI 09.01.02-4 [NOTE: STP provided response to NRC on 08/01/2011. 8/17/11 update
Clarifying questions to be discussed on 8/24/2011 telecom.]

Clarifying Questions

Question: Regarding RAI response to item (a) of RAI 09.01.02-4,

1. The response discusses two deep drop locations. The staff is concerned that two deep drop locations may be insufficient to represent the worst case loading on the baseplate. The staff requests clarification whether other deep drop cases were considered. For example, would a different deep drop location produce higher forces on the leveling screw/leveling pad? Were the steel liner and the concrete floor of the pool evaluated for loads due to an accidental fuel assembly drop? If conducted, provide the results of these evaluations. If not conducted, provide the technical basis for not needing to check this.
2. The response indicates that maximum bending stresses in the baseplate “are judged to occur” in the drop case at location (a). Provide the value of the peak effective plastic strain in the baseplate corresponding to the drop case at location (a).
3. The Spent Fuel Storage Racks Technical Report, Rev 1, states that the drop analysis considered a fuel assembly dropped through the air and loading a dry fuel rack. Confirm that the no water assumption identified in the technical report is still applicable.
4. Clarify (i) whether leveling screws are included in the model; (ii) how welds are modeled (e.g., type of elements and type of material stress-strain curve used, etc.); and (iii) what element type is used for the baseplate and for the support plates.
5. SRP 3.8.4 Appendix D specifies the load combination for drop analysis: $D + L + F_d$. Clarify whether dead load and live load, including the weight of fuel assemblies, were

taken into account in the deep drop analysis. If not, provide the technical basis for excluding these loads.

6. In Figure 4, holes are shown penetrating the large support plates. However, no holes are shown for the small support plates. Please clarify the modeling of the small support plates, which contain 5 holes. If the holes are not modeled, provide the technical basis for this assumption. Explain the physical meaning of the effective plastic strain shown in Figure 4. A similar issue exists for the baseplate effective plastic strain shown in Figure 2, where added holes for water drainage are not modeled.

Question: In the response to item (b), the applicant indicates that a bilinear isotropic material model is used in the analysis, to account for permanent deformation of rack structural components due to a fuel drop. The staff requests that the applicant define the ultimate strain limit used in the shallow drop analysis. Also discuss what happens when this limit is reached in a specific finite element.

Question: In the response to part (e) of RAI 09.01.02-4, the applicant states:

“The maximum vertical deformation [of the baseplate] is 0.87 inches. The rack design provides approximately 2.0 inches of nominal overlap between the neutron absorbing plates and the bottom of the fuel assembly active fuel zone. Therefore, it is concluded that the deformation of the baseplate will not lead to a loss of neutron shielding of the rack.”

“It is noted that the integrity of the welds between the cell walls and baseplate were considered in the evaluations of the deep drop cases. It was found that although the welds that attach the immediate surrounding cell walls could potentially fail, the welds adjacent to this cell will maintain their integrity. Therefore, significant separation between the cell walls and the baseplate will not occur.”

The staff requests clarification whether failure of the welds was directly observed in the LS-DYNA analysis, and is accounted for in the 0.87” vertical deflection. If this is not the case, provide an estimate of the additional vertical deflection due to failure of the welds.

Question: From information in the Spent Fuel Storage Racks Technical Report, Rev 1, the dropped weight is 1,263#, and the drop height is 5.9'. In in-#s, the potential energy is 89,420 in-#. This is the amount of energy that is available to permanently deform the rack. Figure 6 in the response to part (d) shows the stored internal energy at about 0.125 E06, no units specified. Please provide the energy units used in Figure 6, and reconcile the stored internal energy with the initial potential energy of the dropped weight.

Question: In the Spent Fuel Storage Racks Technical Report, Rev 1, Figure 8-4 appears to show seven (7) locations where drops on top of the rack were postulated. Of these 7, 1 is a corner location. In the response to part (e), Figure 7 shows deformation of the rack for the corner drop location; the response simply states this is the worst location, without further explanation. Confirm that in the re-analysis for the 10x10 rack, all 7 locations were analyzed. Provide a description of the results at the other locations. Since WEC also performed accidental drop analyses for the HOLTEC AP1000 spent fuel storage racks, provide a discussion of the similarities and differences between these 2 analyses, including the magnitude and location of the maximum crushing deformation.

RAI 09.01.02-5 [NOTE: Responses to parts c., g., j., k., m., n. due on 09/15/2011.]

- (1) What criteria does ANSYS apply for "bi-section" of the input time step to a 0.0001 sec. time step. Did this occur in the analyses performed? **(Clarified. The criterion is convergence failure after 25 iterations. This did not occur in the STP spent fuel storage rack analyses. Satisfactory explanation.)**
- (2) Clarify Figure 8. The location of weld zones and sizes and locations of support plates shown in Figure 8 are inconsistent with the information provided in other locations of the RAI response document. For example, Figure 8 shows 8 grid weld locations and 12 support locations with same size support plates, while Sketch 14 of RAI response to RAI 09.01.02-2 shows 4-12" fillet welds for cell to cell weld, Sketch 16 of RAI response to RAI 09.01.02-2 shows 8 support plates with two sizes. **(Clarified. Information in the figures reflect the analysis model; this is superseded by the information in the sketches. The latest design information will be used in the updated analysis and documented in the 9/15/11 update to the Technical Report.)**
- (3) On Figure 10, is the "1/2" base plate" a typo? Should be 1-1/2" base plate? **(Clarified. To be fixed in the 9/15/11 update to the Technical Report.)**
- (4) How are the large support plate and leveling pad modeled? Figures 8 through 10 only show the small support plate and leveling screw. **(Clarified. The leveling pad is not modeled explicitly, only the leveling screw is modeled. The size of the leveling pad will be taken into account in detailed hand calculations for loading on the spent fuel pool floor. The revised support plate configuration will be documented in the 9/15/11 update to the Technical Report.)**

RAI 09.01.02-6 [NOTE: Responses to parts b., c., d., e. due on 09/15/2011.]

- (1) Clarify Cell-Cell weld calculation: The leg length of 0.12 inches used in the calculation is inconsistent with the 0.08 inches shown in Sketch 14 of the response to RAI 09.01.02-2. **(Clarified. The correct leg length of the cell-cell weld is 0.08". The leg length is reduced because of the increase of weld length. Correct information will be in the 9/15/11 update to the Technical Report.)**
- (2) In response to Item a, Level D allowable stress calculation, the value of Su used, 68 ksi, is the value at 140 °F, according to Table 4-2 of the spent fuel rack Technical Report. The value at 212 °F should be used. **(Clarified. Data for 212 °F will be used in the 9/15/11 update to the Technical Report.)**
- (3) In response to Item a, Cover plate Weld, it states that "The cover plate weld is evaluated over a length of 5 inches, even though it is a continuous fillet weld." This statement is inconsistent with Sketches 9 through 11 of response to RAI 09.01.02-2, which shows 4-15" fillet weld for cover plate weld. **(Clarified. The weld sizes have been changed to 4" long on 15" center. STP will re-analyze and include in the 9/15/11 update to the Technical Report. 8/17/11 update, STP will not revise RAI response but will address in WCAP update on 9/15/11)**
Also, explain whether a finer element mesh, comparable to the element mesh for cell to cell weld, is used for cover plate weld. **(8/10/11 update. STP stated that a finer element mesh was not used which will be a change from the validation model, update to be provided on 9/15/11.)**

RAI 09.01.02-7

- (1) The staff acknowledges that spent fuel storage racks are not included in the RG 1.26 Quality Group classifications. However, as noted in FSAR Section 9.1.2.1.3, the spent fuel racks are Seismic Category I, in accordance with RG 1.29. As such, all of the QA provisions of 10 CFR 50 Appendix B would appear to be applicable. Clarify what aspects of Appendix B are deemed to be not applicable to spent fuel storage racks, and the basis for this determination. **(Applicant stated that a similar question had been asked and answered during the original DCD review. According to the applicant, the response to Question 210.15 indicated that the QA provisions of 10 CFR 50 Appendix B do not apply to spent fuel racks. In addition, the applicant stated that RG 1.29 provides relief from App. B for certain conditions, which the applicant claims apply to the spent fuel storage racks. NRC & BNL staff to review DCD Chapter 20, question 210.15, DCD Table 3.2-1, and NUREG 1503, Vol. 1, p. 3-12 [ABWR FSER]. STP to evaluate a possible revised response to provide clarification. 8/3/11 update, NRC to review original submittal, RAI response & supporting/referenced documents. 8/17/11 update. STP provided ML# for the QAPD on 8/16/11, NRC to discuss internally.)**
- (2) The staff concurs that the regulatory requirements for periodic ISI of spent fuel storage racks originates from 10 CFR 50.65 "Maintenance Rule". RG 1.160 clarifies acceptable procedures for implementation of the Maintenance Rule, and includes special guidance specifically for structures. Clarify how the guidance provided in RG 1.160 for structures will be implemented for spent fuel storage racks. **(On-going discussion. Question whether DRAP program applies. The peer review group considered Fuel Racks under the DRAP program and determined that the fuel racks not to be included as SSC. STP adopted NEI Maintenance Rule template 0702A, Revision 0, dated 3/08 such that 30 days prior to fuel load the Maintenance Rule goes into effect. STP indicated that "A" at the end designates NRC acceptance. Staff to review the FSAR and NEI Maintenance Rule template. Samir to Contact Todd Hilsmeier to discuss requirements under the DRAP program. STP to evaluate a possible revised response to provide clarification. STP provided input on fuel rack structural integrity inspection routine at Units 1 & 2 on August 8, 2011. 8/10/11 update, NRC to discuss internally.)**

RAI 09.01.02-8 [NOTE: Response has been deferred to 09/15/2011.]

RAI 09.01.02-9

The response discusses an alternate formulation that produced synthetic time histories that do not require peak clipping and baseline correction. However, no quantitative information is provided for the alternate formulation. Eliminating the need for baseline correction and peak clipping would appear to have definite advantages. The alternate time histories may also eliminate the staff's questions (part f.) about the peculiar characteristics of the baseline-corrected displacement time histories presented in the Technical Report. These were NOT addressed in the response. Therefore,

(1) Clarify the basis for retaining the initial synthetic time histories, even though several difficulties are overcome by the alternate formulation; and

(2) Provide answers to the staff's questions in part f. of the RAI, including comparison to the displacement time histories obtained by the alternate formulation.

(8/3/11 update, NINA to submit revised RAI response utilizing & justifying use of original synthetic time history addressing clarifying questions. Further discussion to be held after NRC staff receives and reviews revised RAI response. NINA provided draft revised RAI response to NRC on 8/5/11. 8/17/11 update, STP to provide revised RAI response shortly. Digital time histories analysis information provided by STP, NRC waiting on receipt to forward to BNL for review)

Draft RAI 5987

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

09.01.02-***

Spent Fuel Assembly Integrity

As indicated in Section I.3 of SRP 3.8.4, Appendix D, loads generated by the impact of fuel assemblies during a postulated seismic excitation should be considered for local as well as overall effects, and it should be demonstrated that the consequent loads on the fuel assembly do not lead to damage of the fuel. Section I.4 of SRP 3.8.4, Appendix D, specifies that the applicant demonstrate that the functional capability and/or the structural integrity of each component is maintained. Therefore, for a complete review of the structural analysis of the spent fuel storage racks, including the spent fuel assemblies, the staff requests that the applicant describe the technical basis for (1) establishing the functional capability and structural integrity of the spent fuel assemblies, and (2) ensuring no fuel damage, when subjected to impact loads resulting from the postulated seismic excitation of the spent fuel storage racks. Include this information in an appropriate section of the spent fuel racks technical report. The response should specifically address the following:

- a. Describe how the seismic demand on the spent fuel assemblies was determined, including considering maximum impact force due to both in phase and out of phase movement of fuel assemblies during a seismic event.
- b. Describe the methodology used to determine the maximum allowable impact force that spent fuel assemblies are capable of withstanding.
- c. Define the acceptance criteria used for functional capability, structural integrity, and no fuel damage.
- d. Describe how the effects of irradiation embrittlement of the fuel rods, at initial storage and long term, are considered in the evaluation.

- e. Compare the calculated capacity to the calculated demand, to demonstrate that the spent fuel assemblies will maintain their integrity under seismic loading.

[8/17/2011 Update. Draft RAI to be discussed on 8/24/11 telecom.]

Request for Additional Information No. 5987 Revision 5

South Texas Project Units 3 and 4
South Texas Project Nuclear Operating Co
Docket No. 52-012 and 52-013
SRP Section: 09.01.02 - New and Spent Fuel Storage
Application Section: FSAR 9.1.2

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

09.01.02-***

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