Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

U.S. Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, D.C. 20555

Direct tel: 412-374-6206
Direct fax: 412-374-5005
e-mail: sisk1rb@westinghouse.com

Your ref: Docket No. 52-006
Our ref: DCP/NRC2415

April 1, 2009

Subject: AP1000 Response to Request for Additional Information (SRP 9)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 9. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Enclosure 1 provides the response for the following RAI(s):

RAI-SRP9.1.2-SEB1-02

Questions or requests for additional information related to the content and preparation of this response should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Enclosure

1. Response to Request for Additional Information on SRP Section 9

D063
NRO

cc:	D. Jaffe	-	U.S. NRC	1E
	E. McKenna	-	U.S. NRC	1E
	P. Buckberg	-	U.S. NRC	1E
	C. Proctor	-	U.S. NRC	1E
	T. Spink	-	TVA	1E
	P. Hastings	-	Duke Power	1E
	R. Kitchen	-	Progress Energy	1E
	A. Monroe	-	SCANA	1E
	P. Jacobs	-	Florida Power & Light	1E
	C. Pierce	-	Southern Company	1E
	E. Schmiech	-	Westinghouse	1E
	G. Zinke	-	NuStart/Entergy	1E
	R. Grumbir	-	NuStart	1E
	P. Loza	-	Westinghouse	1E

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 9

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP9.1.2-SEB1-02
Revision: 0

Question:

Section 2.8.1.4 "Impact Loads" was not revised in TR-44 Rev. 1, even though shims between the new fuel rack and the fuel pit wall apparently are no longer used. Shims are still mentioned in Rev. 1. Quoting from Section 2.8.1.4, "The maximum impact load from the set of shims that close the north-south gaps at the top of the rack is summarized in Table 2-8." The staff requests Westinghouse to clarify this, and revise Section 2.8.1.4 accordingly.

The staff also notes that the maximum rack-to-wall impact load in Table 2-8 increased from 112,000# in Rev. 0 to 154,000# in Rev. 1. The staff requests Westinghouse to explain why the impact load increased, and describe how the design of the new fuel rack and the new fuel pit wall were evaluated for the significant increase (35%) in the impact load, in addition to other concurrent loadings. Also identify where this is/will be described in the AP1000 DCD.

Westinghouse Response:

The shims have been eliminated from the new fuel rack design and analysis. All mentions of the rack-to-wall shims should be disregarded. TR-44 Rev 1, Section 2.8.1.4 should be read, "The maximum impact load from the pit walls ~~set of shims that close the north-south gaps~~ at the top of the rack is summarized in Table 2-8." Also note that page 5 of 46 unintentionally continues to indicate that the shims are still included in the design and analysis, which they are not. The following sentence on page 5 (half way through first paragraph) should be deleted, "~~The rack-to-wall (north and south side) impact spring gaps at the top are reduced to zero to reflect the shims that are in place, which absorb the impact load and transmit them to the pool wall.~~"

There are 2 reasons why the load increased. The first is that the floor response spectra for the new fuel vault floor were revised in TR-44 Rev. 1. The second reason for the change in impact load is the elimination of the shims from the design and analysis. In TR-44 Rev. 0, the new fuel rack was shimmed against the corbels on the North and South walls of the new fuel vault. This configuration produced a maximum impact load of 112,000 lb between the top of the new fuel rack and the corbel at the location of the shims. The new design eliminates the shims at the top of the new fuel rack, as well as the corbels on the North and South walls of the new fuel vault. As a result, the minimum clearance between new fuel rack and the walls of the new fuel vault is almost 6 inches. Per the latest analysis, when the coefficient of friction between the rack pedestals and the floor is assumed to be 0.2 (which is an extreme lower bound value for a clean and dry steel on steel interface), the rack slides along the floor and impacts the North and South walls at the rack baseplate elevation with a maximum impact force of 154,600 lbf. The cell region of the new fuel rack does not impact the vault walls under any of the analyzed conditions.

Although the seismic analysis of the new fuel rack considers three different coefficients of friction (0.2, 0.5, and 0.8 - the same conditions considered under wet conditions in the analysis of the spent fuel racks) between the support pedestals and the floor liner, the reality is that the coefficient of friction will be greater than 0.5 since the new fuel pit, unlike the spent fuel pool, is not flooded with water. Per Marks' Standard Handbook for Mechanical Engineers (Tenth Edition), the static coefficient of friction for steel on steel (dry) is between 0.74 and 0.78. Therefore, since the seismic analysis shows no rack-to-wall impacts when the coefficient of friction is equal to or greater than 0.5, the new fuel pit walls are not analyzed for any rack-to-wall impacts.

The new fuel rack base plate, which is machined from a ¾" thick stainless steel plate (SA240-304), is intentionally designed to resist high impact loads in the in-plane direction. For example, assuming that the impact spreads over a 10" horizontal baseplate width, the impacted area of the baseplate is 10" x ¾" = 7.5 sq. in. Using the Level A bearing stress limit of 0.9 Sy per ASME Subsection NF, the impact capacity of the baseplate is 7.5 sq. in x (0.9 x 25,000 psi) = 168,750 lbf. The baseplate of the rack is conservatively designed considering the statements above which indicate that in reality the new fuel rack will not impact the new fuel pit walls.

Reference(s):

1) Marks' Standard Handbook for Mechanical Engineers, 10th Edition, Theodore Baumeister, 1996.

Design Control Document (DCD) Revision: None.

PRA Revision: None.

Technical Report (TR) Revision:

The following changes should be made to TR-44; however, these changes do not necessitate a subsequent submittal of TR-44 to the NRC for review.

Section 2.8.1.4 should be read, "The maximum impact load from the pit walls ~~set of shims that close the north-south gaps~~ at the top of the rack is summarized in Table 2-8."

The following sentence on page 5 of 46 (half way through first paragraph) should be deleted, "~~The rack-to-wall (north and south side) impact spring gaps at the top are reduced to zero to reflect the shims that are in place, which absorb the impact load and transmit them to the pool wall.~~"