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Your ref: Docket No. 52-006
Our ref: DCP_NRC_002820

March 12, 2010

Subject: AP1000 Response to Request for Additional Information (SRP 3)

Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 3. 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-SRP3.8.3-SEB1-04 R1

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,

A handwritten signature in black ink, appearing to read 'R. Sisk' followed by a large, stylized flourish.

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

/Enclosure

1. Response to Request for Additional Information on SRP Section 3

DOB3
NRD

cc:	D. Jaffe	- U.S. NRC	1E
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	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
	D. Lindgren	- Westinghouse	1E

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 3

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP3.8.3-SEB1-04

Revision: 1

Question:

Due to design changes, extension of the AP1000 design to soil sites, reanalysis for updated seismic spectra, and updates made to some critical sections, Westinghouse is requested to address a concern with the design details of the structural module connections to the reinforced concrete basemat. Section 3.8.3.5.3 of the DCD indicates that the steel plate modules are anchored to the reinforced concrete basemat by mechanical connections welded to the steel plate or by lap splices where the reinforcement overlays shear studs on the steel plate. Typical details of these two options are shown on DCD Figure 3.8.3-8, sheets 1 and 2. Westinghouse is requested to address the following two items:

1. The left side of Figure 3.8.3-8, sheet 2, shows that the mechanical connectors that are welded to a $\frac{3}{4}$ inch plate at the base of the module is identified as "CONT" (presumably meaning continuous) on one side of the module and on the other side the term "CONT" is struck out. Explain which detail is correct and revise the figure accordingly. Were the design detail calculations completed for this connection? Explain how the large loads coming from the CIS wall modules can be properly transferred from the module wall plate at a localized point to the embedded connectors.
2. The right side of Figure 3.8.3-8, sheet 2 shows #11 at 10 inch spacing span from the embedded basemat region into the wall module with about 3 inches of concrete cover. Since this type of connection is not addressed in ACI 349, describe how the loads from the module can be properly transferred from the module to the embedded bars in the basemat and how the design will be performed. When this detail was discussed with Westinghouse at an earlier audit this year, Westinghouse indicated that they would consider removing this second option.

If your response to this request for additional information will reference Revision 17 to the AP1000 DCD, please provide an exact reference.

Revision 1

Provide information on the connection of structural modules to base concrete in the RAI response.

Westinghouse Response:

1. The plate at the base of the module does not need to be continuous. The revised typical detail is shown in Figure RAI-SRP-3.8.3-SEB1-04-01 and will be included in the DCD. An alternate version of this detail is used in cases where the trusses are extended into the basemat as shown in RAI-SRP-3.8.3-SEB1-04-02. The vertical dowel bars are placed in two layers. The base plate is stiffened to transfer the loads from the module wall plate to the embedded connectors. The design of the surface plate, base plate, and vertical stiffeners is checked by finite element analysis using the model shown in Figure

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Response to Request For Additional Information (RAI)

RAI-SRP-3.8.3-SEB1-04-03. Tension corresponding to yield is applied to each dowel bar. These design calculations have been completed.

2. The right side of Figure 3.8.3-8, sheet 2 shows a dowel bar adjacent to the surface plate. The design of this type of connection is based on recommendations and test data given in Reference 1. The reference provides a design equation to calculate the strength of the connection based on key parameters such as concrete strength, dowel bar length and spacing, and concrete cover. This detail may be used when loading on the surface plates is within the range of the test data. It is used at the base of the CA05 module inside containment and the CA20 module outside containment where design loads are smaller.

Westinghouse Response to Revision 1:

The revised typical detail is shown in Figure RAI-SRP-3.8.3-SEB1-04-01A and provides information on the connection of structural modules to base concrete. The revised DCD figure is provided.

Reference:

1. Tsuda, K, Nakayama, T., Eto, H., Akiyama, K., Shimizu, A., Tanouchi, K, and Aoyama, H., "Experimental Study on Steel Plate Reinforced Concrete Shear Walls with Joint Bars", SMIRT Paper # 1086, August 2001.

Design Control Document (DCD) Revision:

Delete "cont" from left side of DCD Rev 17 Figure 3.8.3-8, sheet 2, as shown corrected in Figure RAI-SRP3.8.3-SEB1-04-01.

Replace the left side of DCD Rev 17 Figure 3.8.3-8, Sheet 2, with Figure RAI-SRP-3.8.3-SEB1-04-01A, Typical detail at base of CA01 Module Wall with single layer of dowel bars (Note: Spacing, type of the bars and size of the plates are various). The updated DCD Figure 3.8.3-8, Sheet 2 is provided as Page 7 of this response.

PRA Revision:

None

Technical Report (TR) Revision:

None

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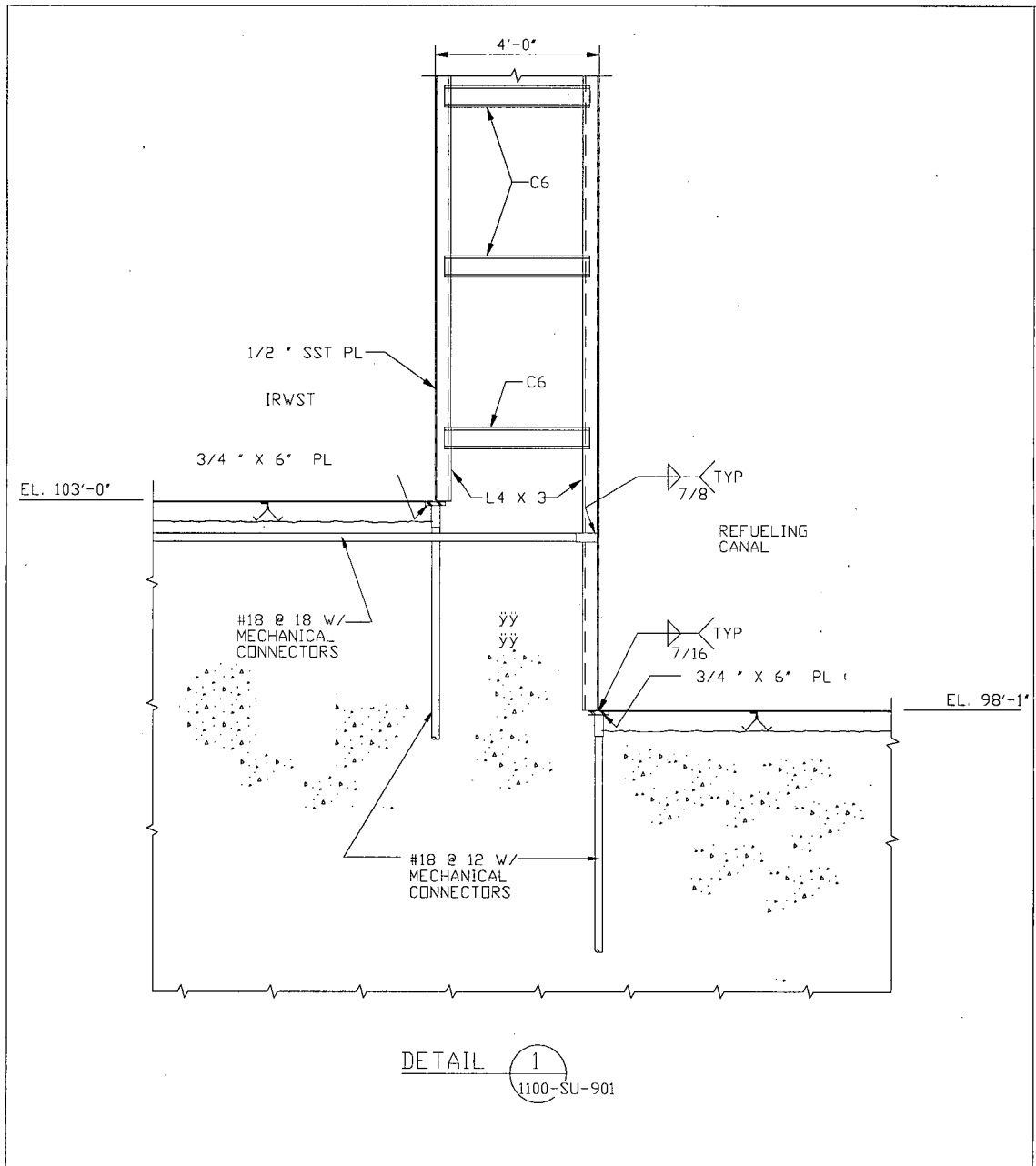


Figure RAI-SRP-3.8.3-SEB1-04-01
Typical detail at base of CA01 Module Wall with single layer of dowel bars

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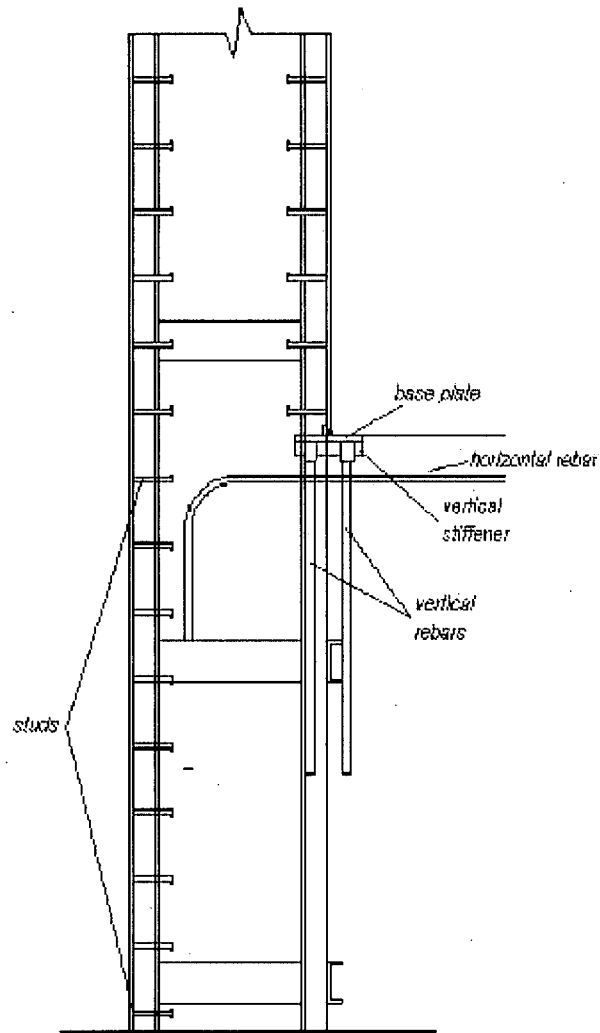


Figure RAI-SRP-3.8.3-SEB1-04-02
Typical detail at base of CA01 Module Wall with double layer of dowel bars

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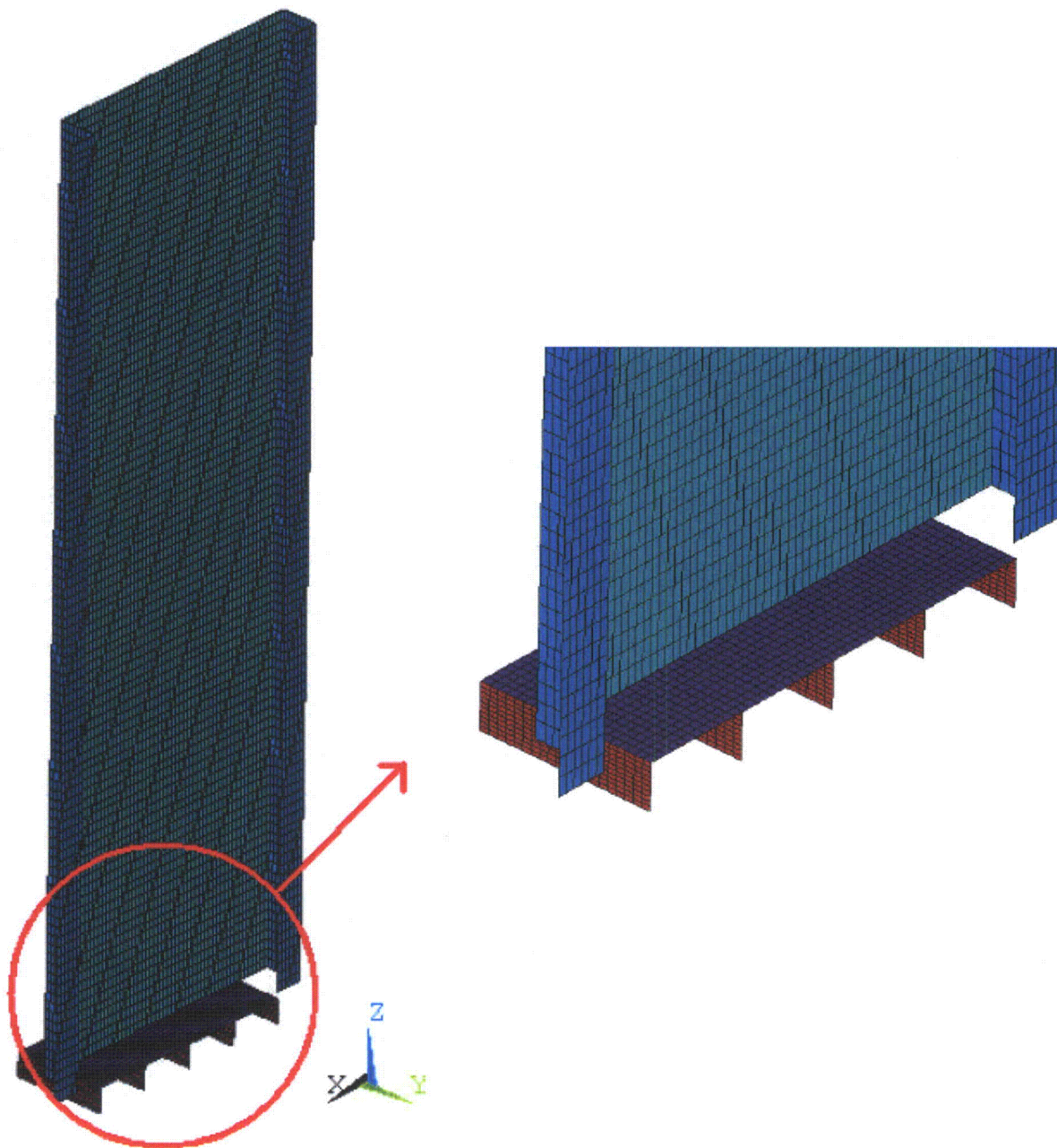


Figure RAI-SRP-3.8.3-SEB1-04-03

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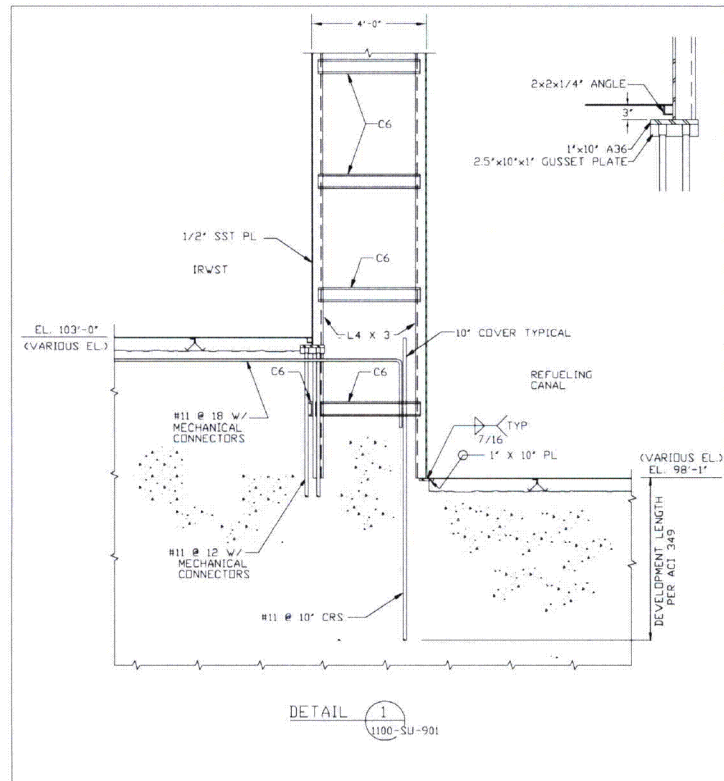


Figure RAI-SRP-3.8.3-SEB1-04-01A

Typical detail at base of CA01 Module Wall with single layer of dowel bars
(Note: Spacing, type of the bars and size of the plates are various)

Response to Request For Additional Information (RAI)

