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

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Your ref: Docket No. 52-006  
Our ref: DCP\_NRC\_002520

June 9, 2009

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

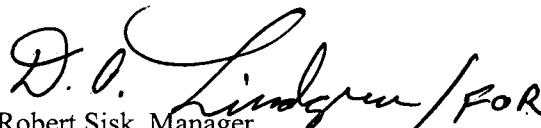
Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 3. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in this response is generic and is expected to apply 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-SRP3.7.1-SEB1-11 R2

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 3

cc:	D. Jaffe	- U.S. NRC	1E
	E. McKenna	- U.S. NRC	1E
	B. Gleaves	- 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
	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)

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RAI Response Number: RAI-SRP3.7.1-SEB1-11

Revision: 2

### **Question:**

The staff requests that Westinghouse provide additional figures in Section 5.2 TR-115, to include all location/direction combinations presented in the Section 5.1 figures, and to provide a cross-reference between the corresponding 5.1 and 5.2 figures.

### **Additional Request (Revision 2):**

More data, i.e., HRHF response spectra for 5 locations on the basemat (4 locations at 4 corner and center) comparison of coherent at 5 nodes, 25 samples of incoherent and average of 25 incoherent response spectra.

### **Westinghouse Response:**

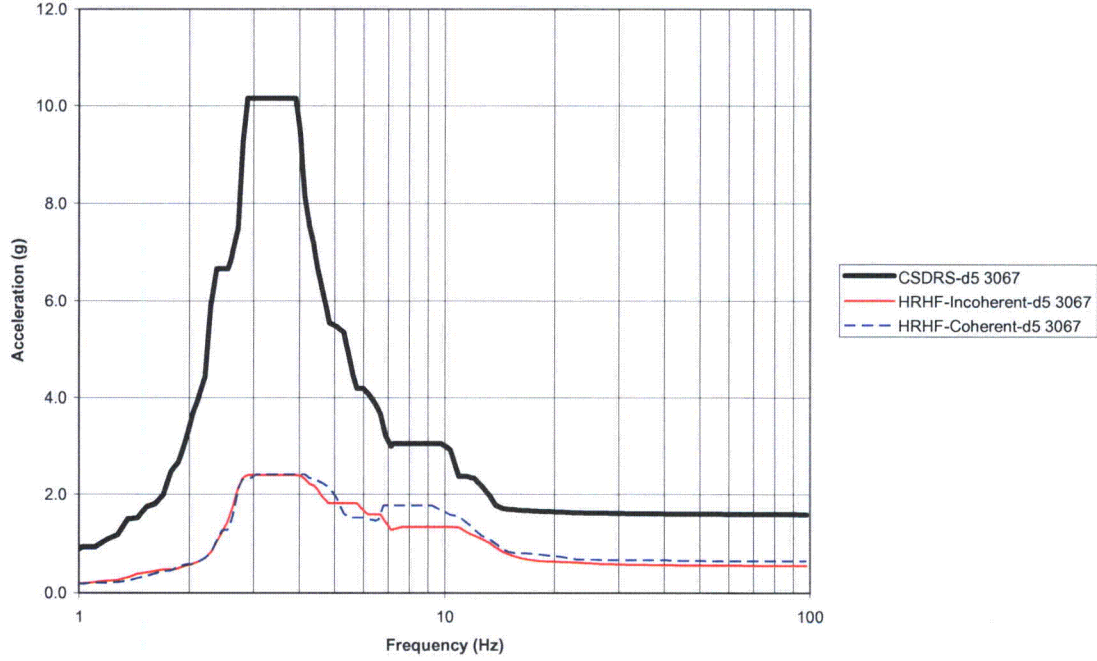
The figures provided in Section 5.1 are for comparison of NI10 and NI20 models. The time histories are different from that used in the HRHF evaluation documented in TR-115 as discussed in the Westinghouse response to RAI-SRP3.7.1-SEB01-07. No reduction for incoherency was considered. A representative group of HRHF floor response spectra were developed at locations considered susceptible to the high frequency response for comparison to the CSDRS floor response spectra. Some of these locations are the same or close to those given in Section 5.1. It would not be useful to add additional figures in Section 5.2 since the locations chosen are considered sufficient for comparison. A cross-reference between corresponding 5.1 and 5.2 figures cannot be given since different time histories are used.

In response to the NRC's request to supplement Section 5.2 in the TR-115 during May 19-23, 2008, Westinghouse has provided incoherent and coherent comparison response spectrum for the nodal locations presented in TR-115 Section 5.1. These spectra are presented below in Figure RAI-SRP3.7.1-SEB1-11-1 to RAI-SRP3.7.1-SEB1-11-9 (5% damping).

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

FRS Comparison X Direction

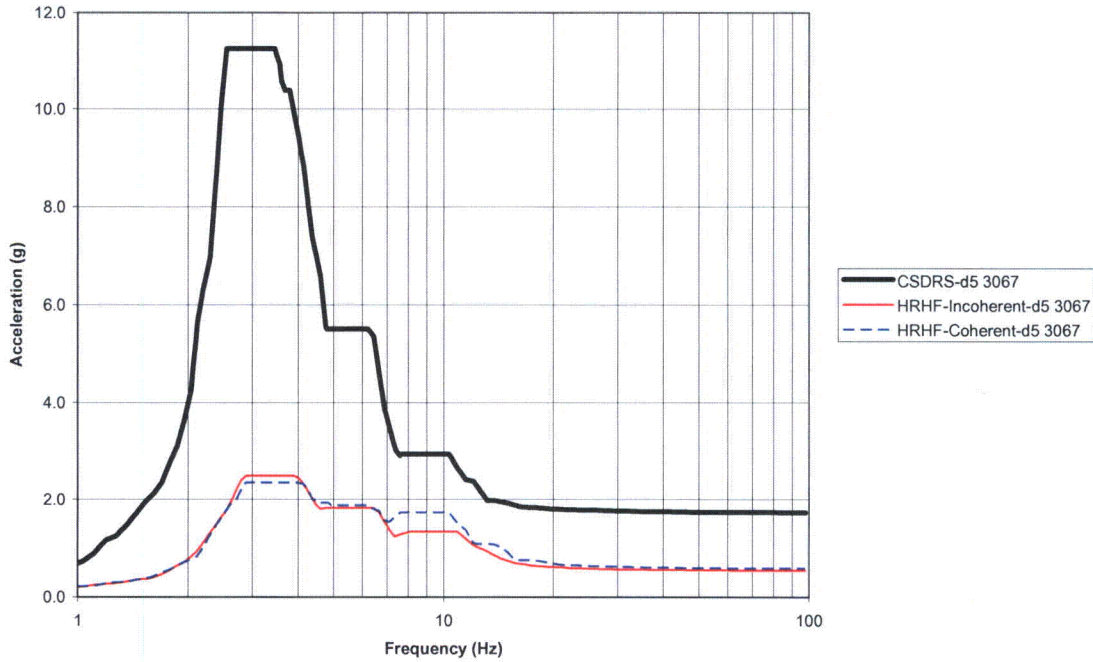


RAI-SRP3.7.1-SEB1-11-1: Seismic Response Spectra on roof of Shield Building X-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

FRS Comparison Y Direction

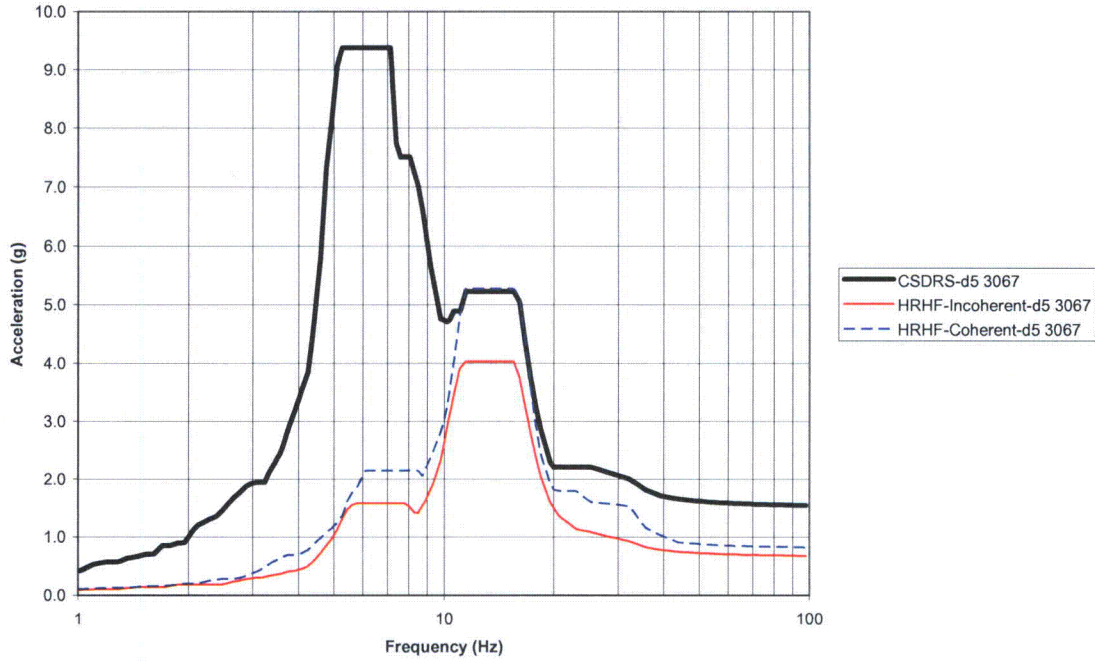


RAI-SRP3.7.1-SEB1-11-2: Seismic Response Spectra on roof of Shield Building Y-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

FRS Comparison Z Direction

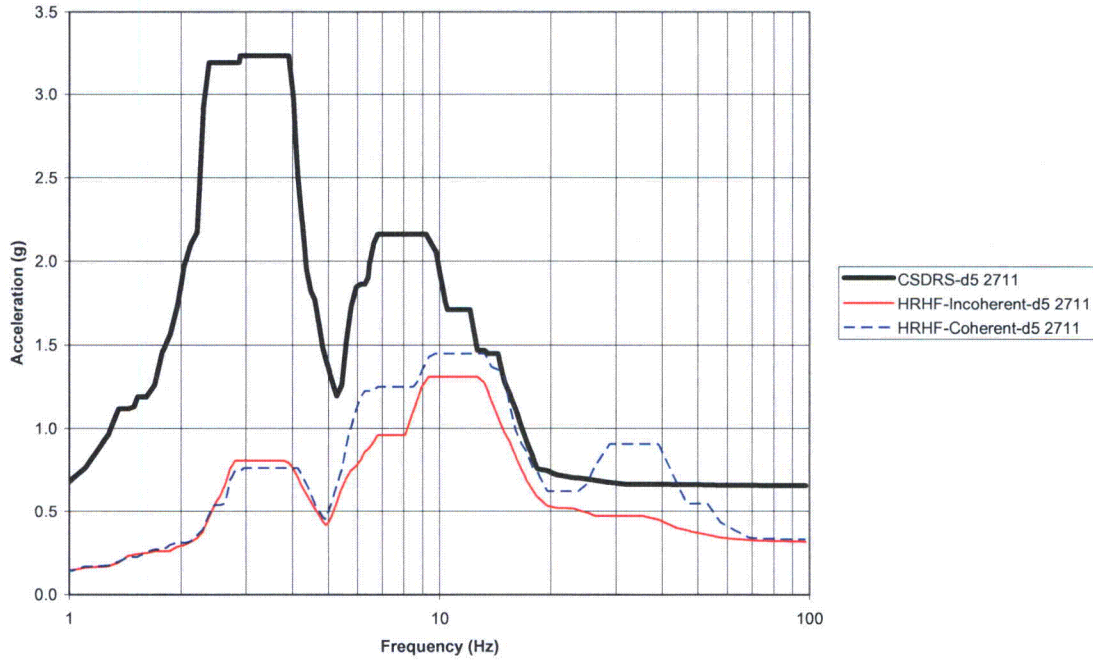


RAI-SRP3.7.1-SEB1-11-3: Seismic Response Spectra on roof of Shield Building Z-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

FRS Comparison X Direction

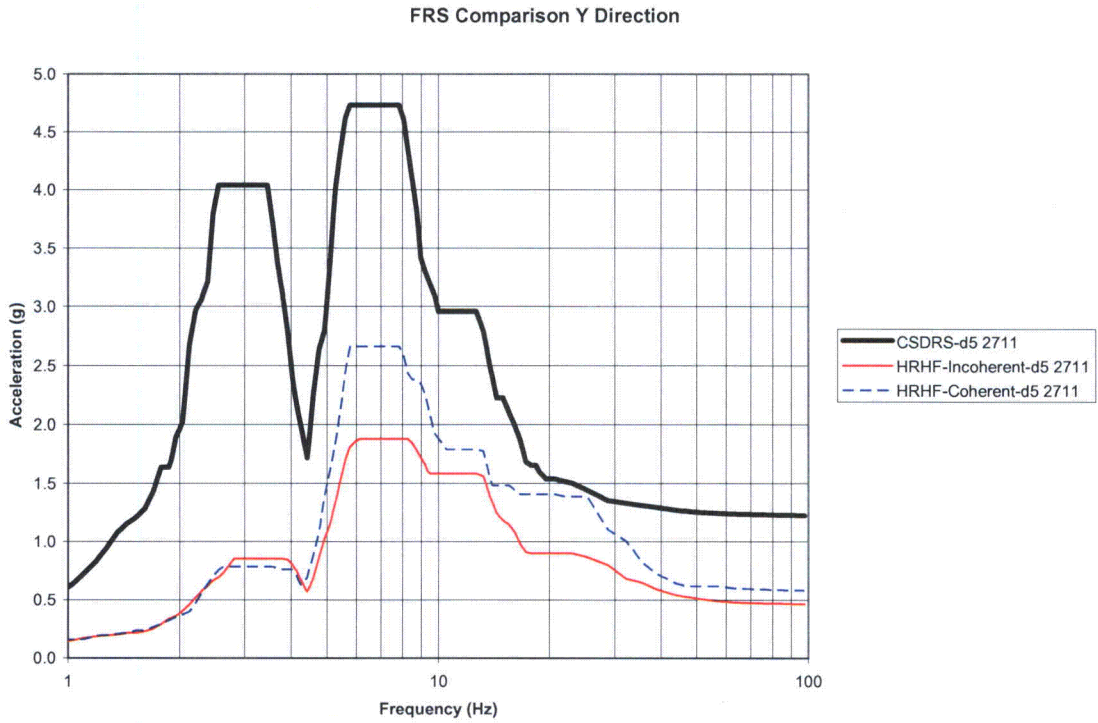


RAI-SRP3.7.1-SEB1-11-4: Seismic Response Spectra for West Side of Shield Building X-Direction



# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

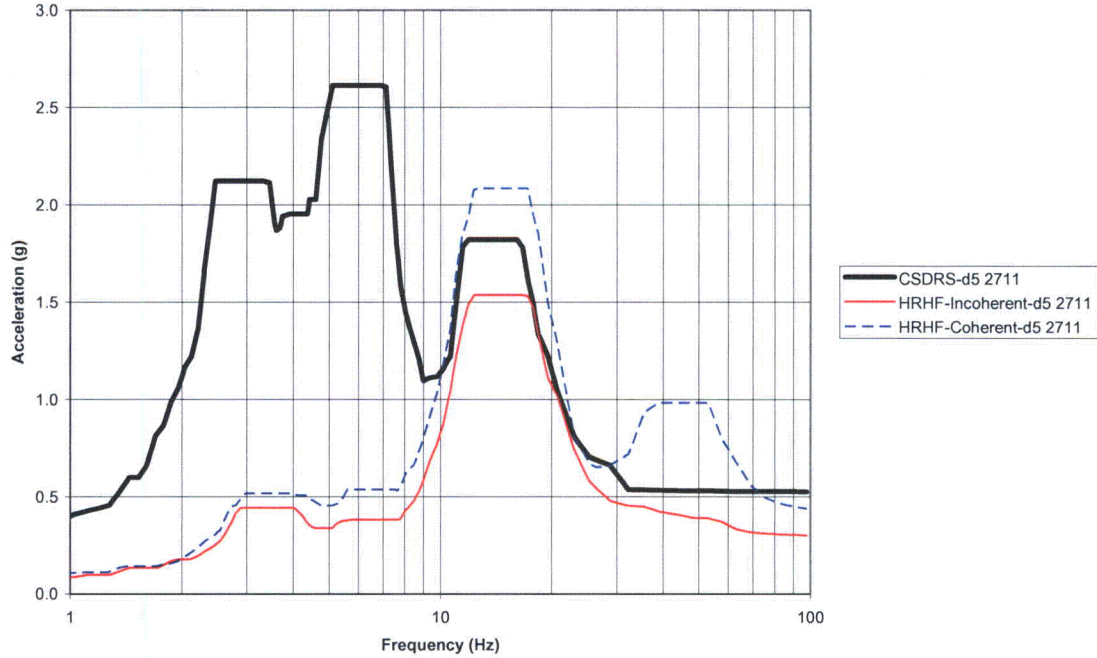


RAI-SRP3.7.1-SEB1-11-5: Seismic Response Spectra for West Side of Shield Building Y-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

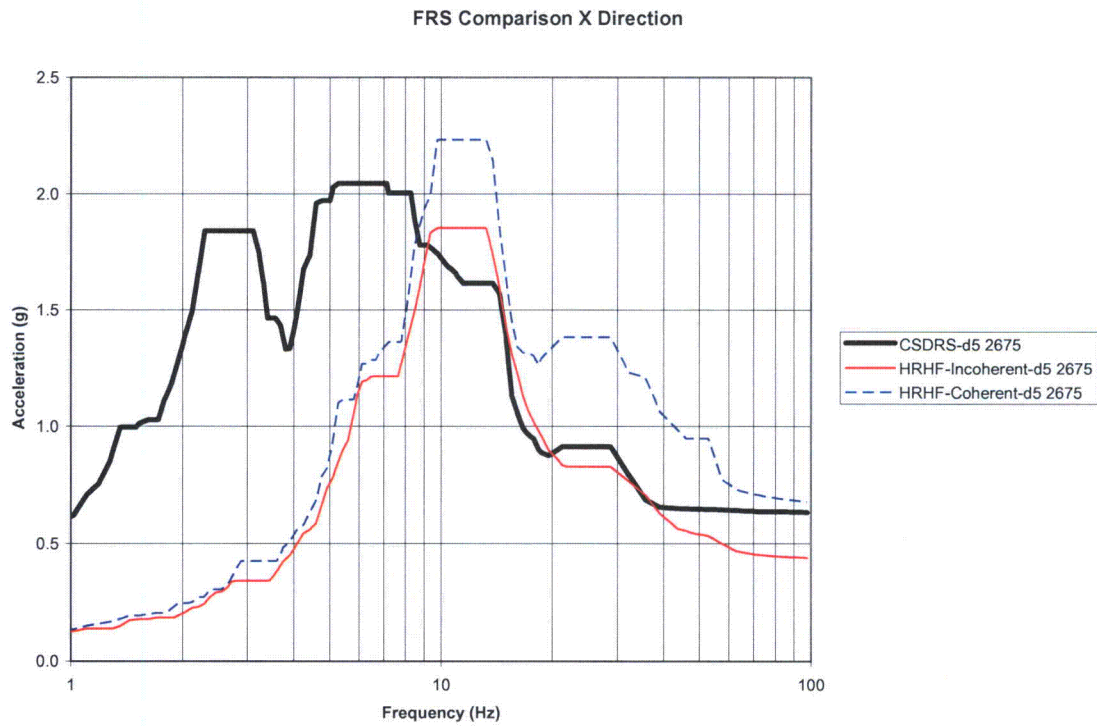
FRS Comparison Z Direction



RAI-SRP3.7.1-SEB1-11-6: Seismic Response Spectra for West Side of Shield Building Z-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

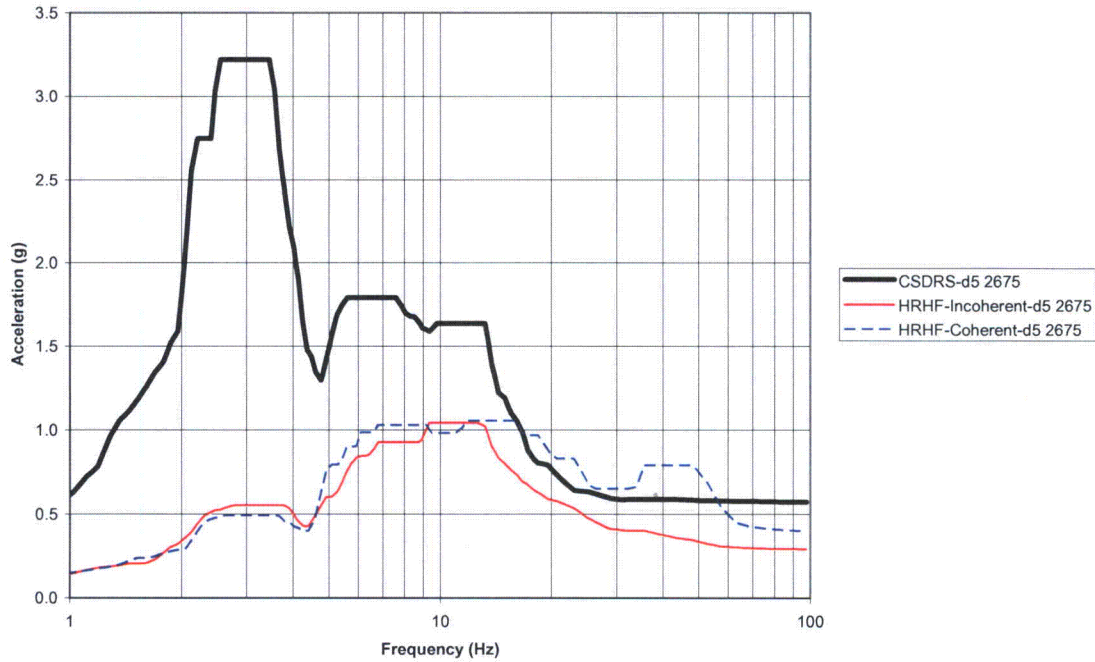


RAI-SRP3.7.1-SEB1-11-7: Seismic Response Spectra for South Side of Shield Building X-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

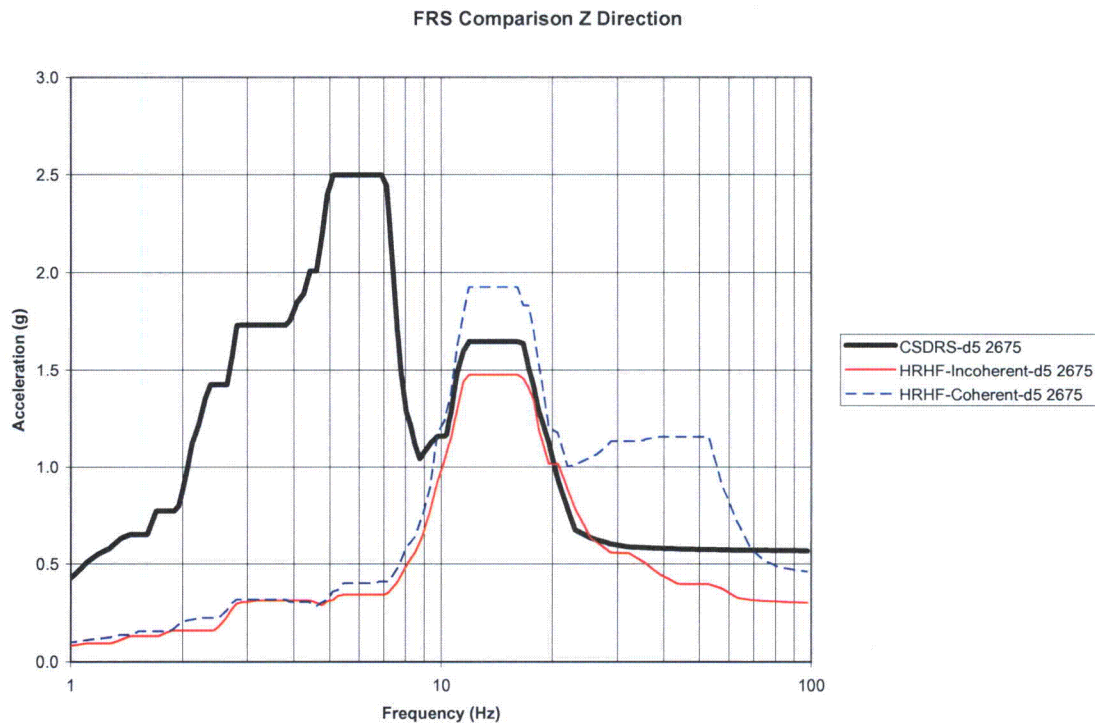
FRS Comparison Y Direction



RAI-SRP3.7.1-SEB1-11-8: Seismic Response Spectra for South Side of Shield Building Y-Direction

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)



### RAI-SRP3.7.1-SEB1-11-9: Seismic Response Spectra for South Side of Shield Building Z-Direction

#### **Westinghouse Response (Revision 2):**

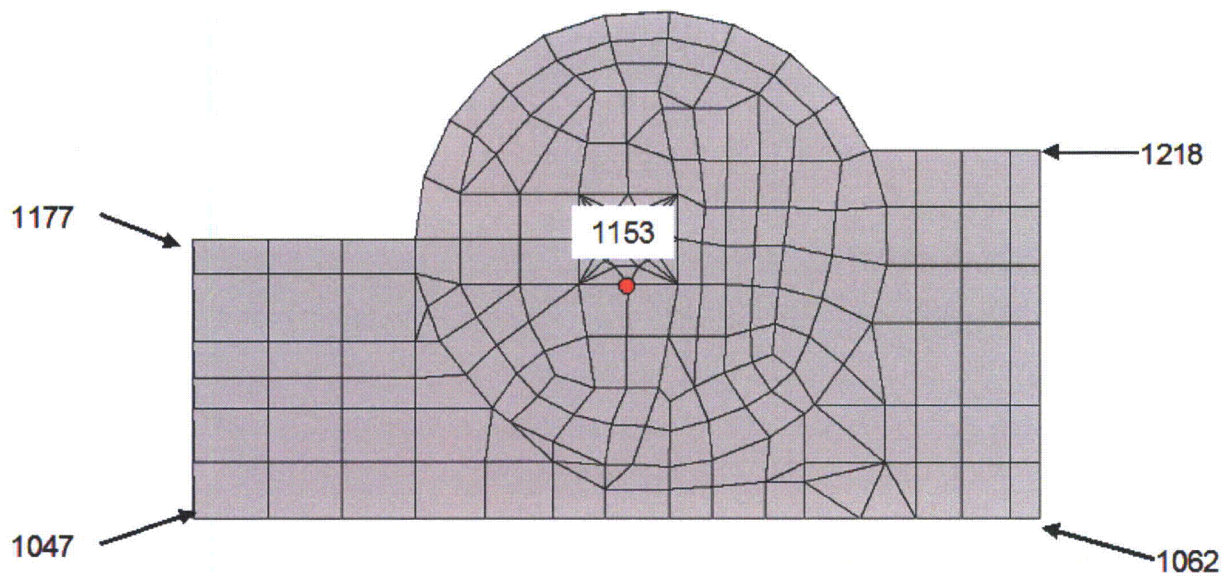
Following the NRC Audit of AP1000 Seismic Design the week of April 13-17, 2009, the NRC has requested additional HRHF FRS at the four corners and center of the Nuclear Island basemat. The nodal locations of the response spectra comparisons have been provided in a plot shown in Figure RAI-SRP3.7.1-SEB1-11-10. A comparison of the SRSS combined X, Y and Z directions for incoherent simulations, average incoherent and coherent FRS are shown in Figures RAI-SRP3.7.1-SEB1-11-11 through RAI-SRP3.7.1-SEB1-11-25. The plots provided show a general reduction in the 25 incoherent simulations when compared to the coherent response in the higher frequencies. At lower elevations, the incoherent simulations exceed the coherent responses in the z-direction around the 10-20 Hz range; these exceedances do not exist at higher elevations as seen in Figures RAI-SRP3.7.1-SEB1-11-1 through RAI-SRP3.7.1-SEB1-11-9.

#### Index for Figures RAI-SRP3.7.1-SEB1-11-11 through RAI-SRP3.7.1-SEB1-11-25:

- sim # - Incoherent Simulation (total of 25)
- AVG - Average of the Incoherent Simulations
- COH - Coherent Response

# AP1000 TECHNICAL REPORT REVIEW

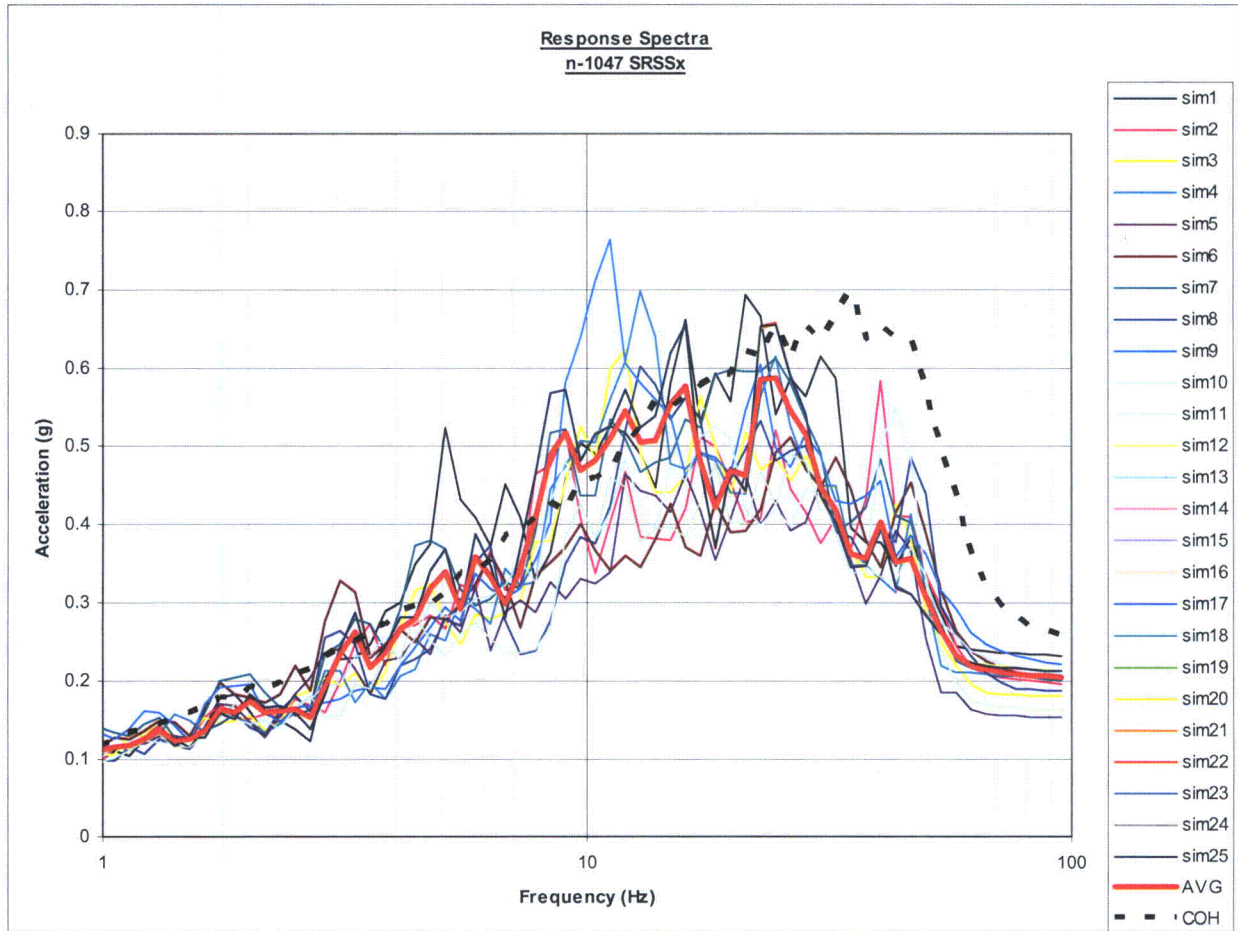
## Response to Request For Additional Information (RAI)



RAI-SRP3.7.1-SEB1-11-10: Basemat Nodal Locations, Elevation 60.5'

# AP1000 TECHNICAL REPORT REVIEW

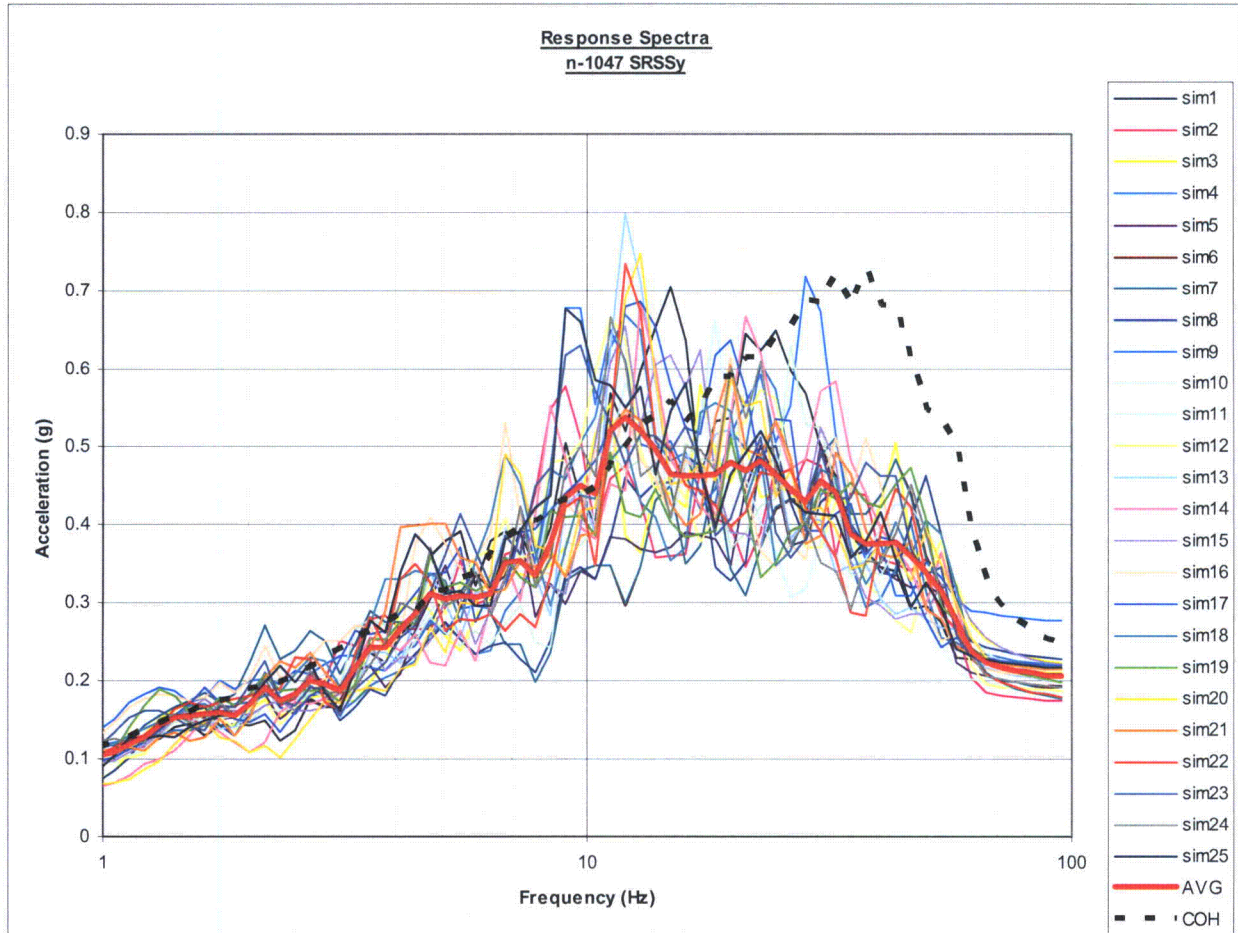
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-11: Node 1047-SRSS X-Direction, Southeast Corner**

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

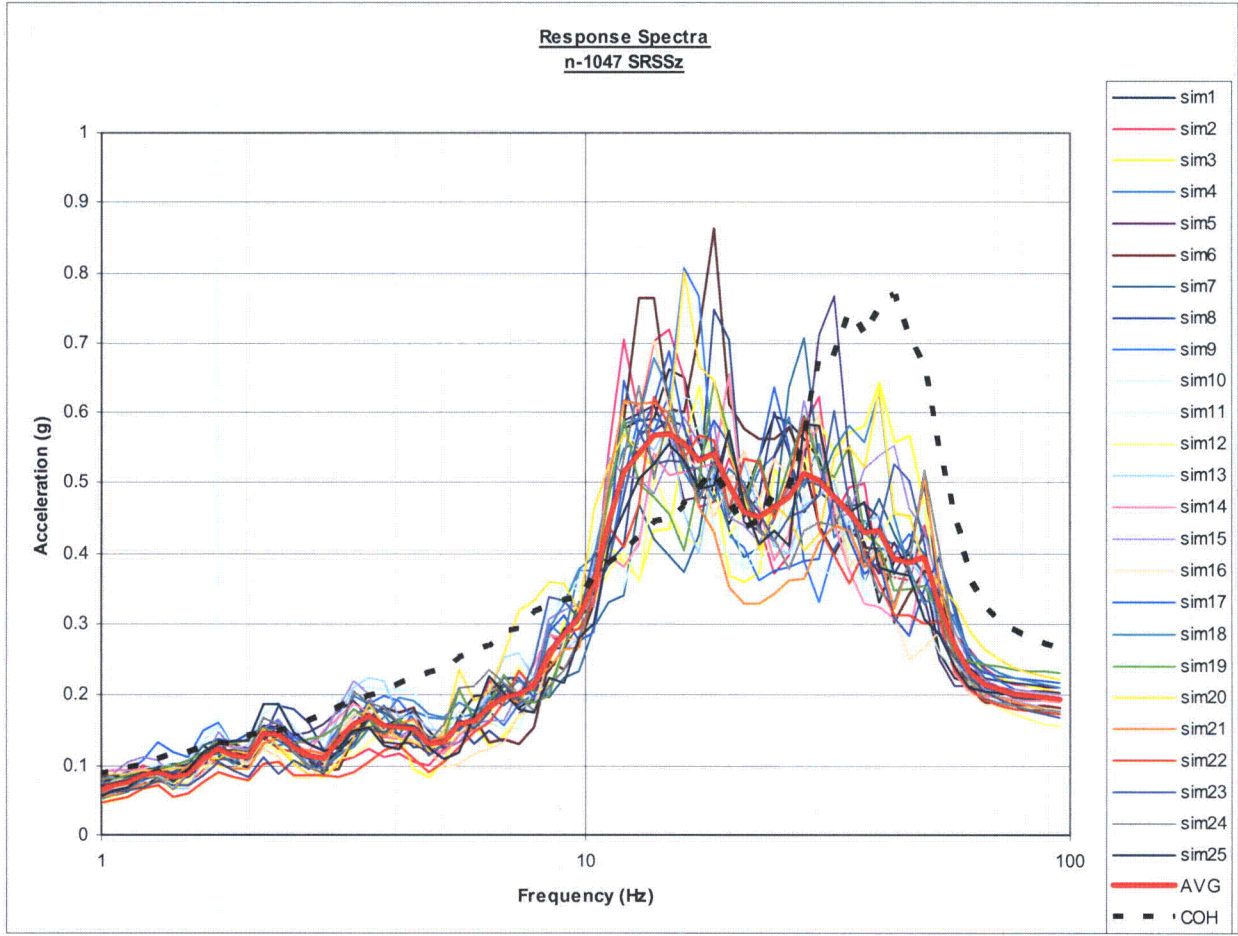


**RAI-SRP3.7.1-SEB1-11-12: Node 1047-SRSS Y-Direction, Southeast Corner**



# AP1000 TECHNICAL REPORT REVIEW

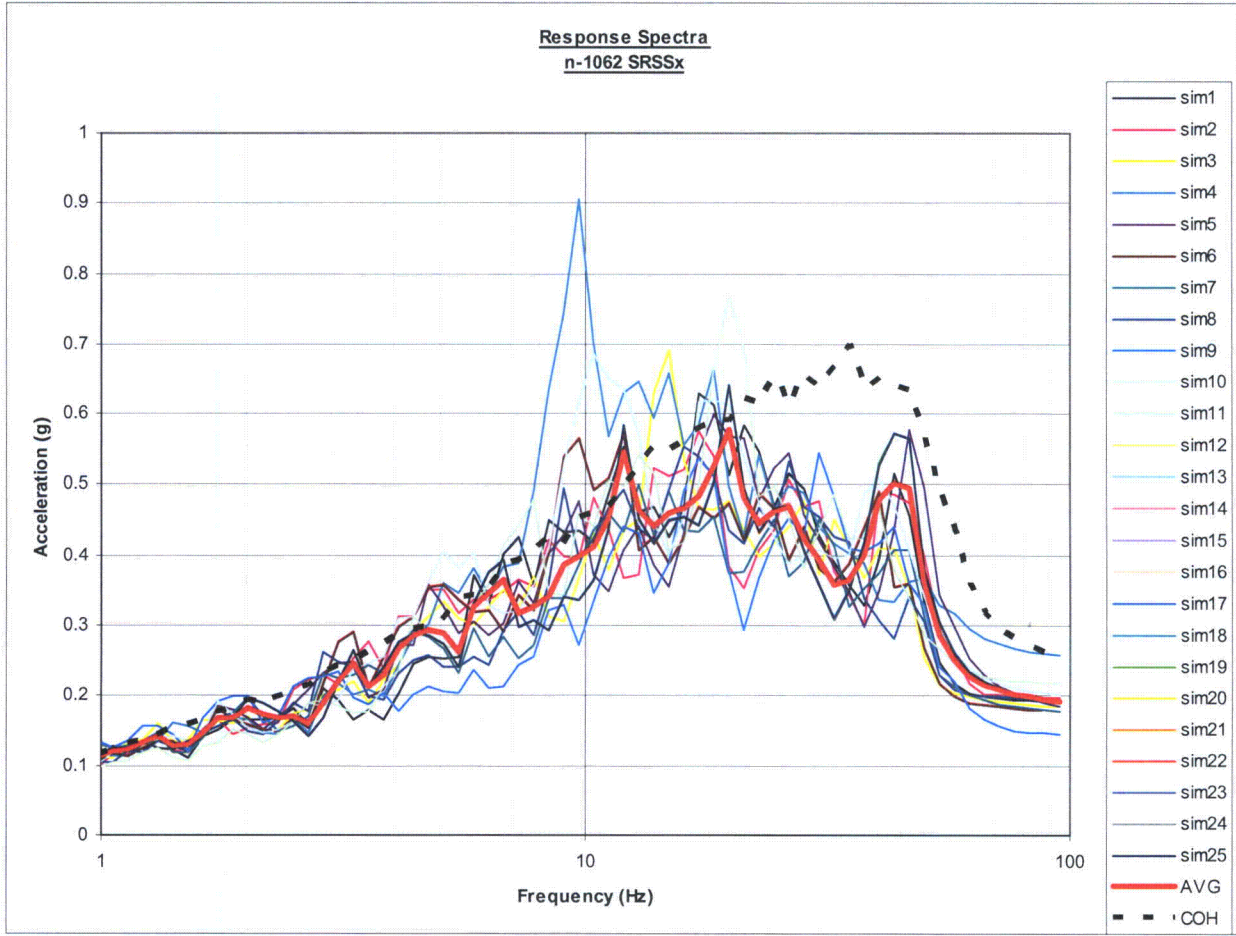
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-13: Node 1047-SRSS Z-Direction, Southeast Corner**

# AP1000 TECHNICAL REPORT REVIEW

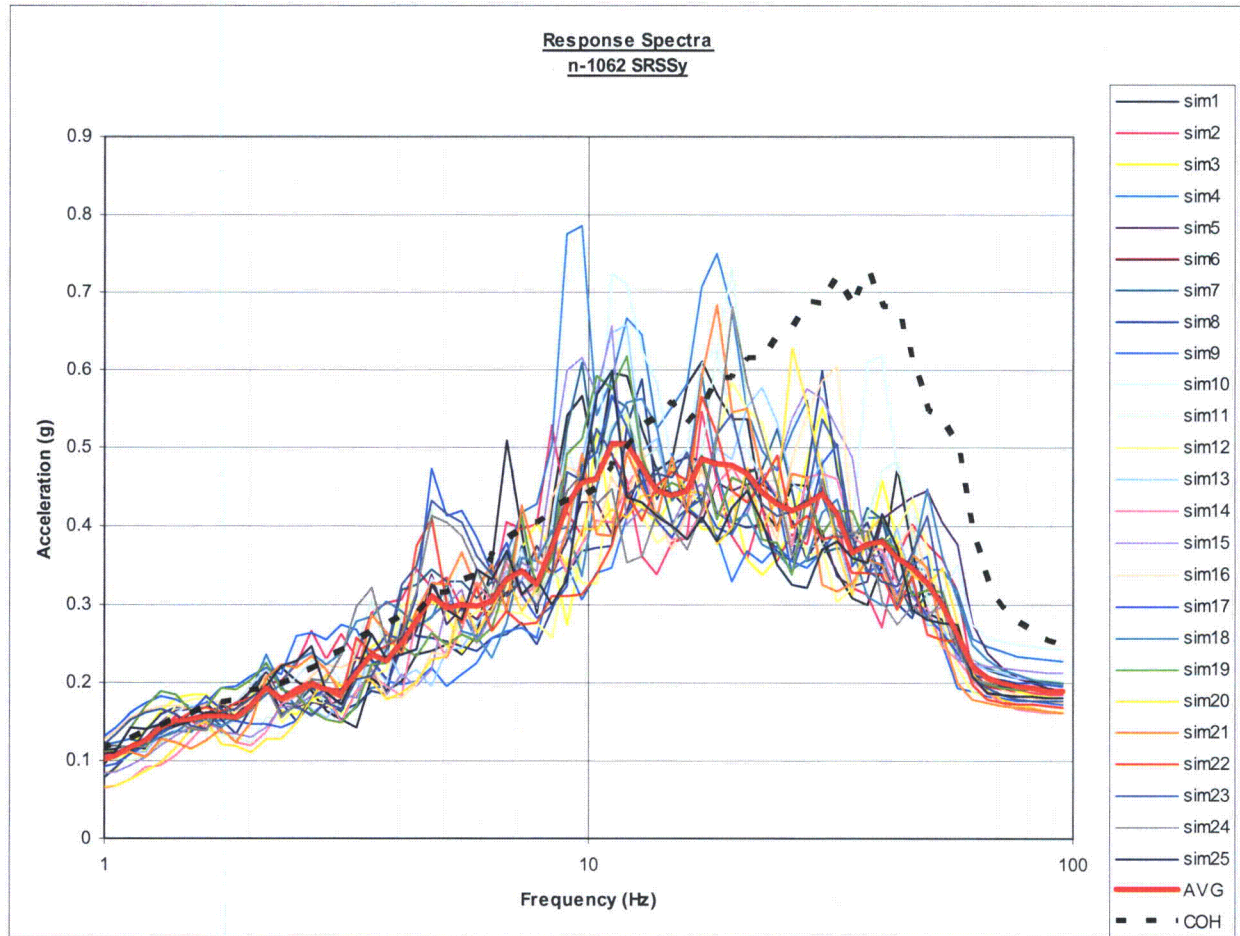
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-14: Node 1062-SRSS X-Direction, Northeast Corner**

# AP1000 TECHNICAL REPORT REVIEW

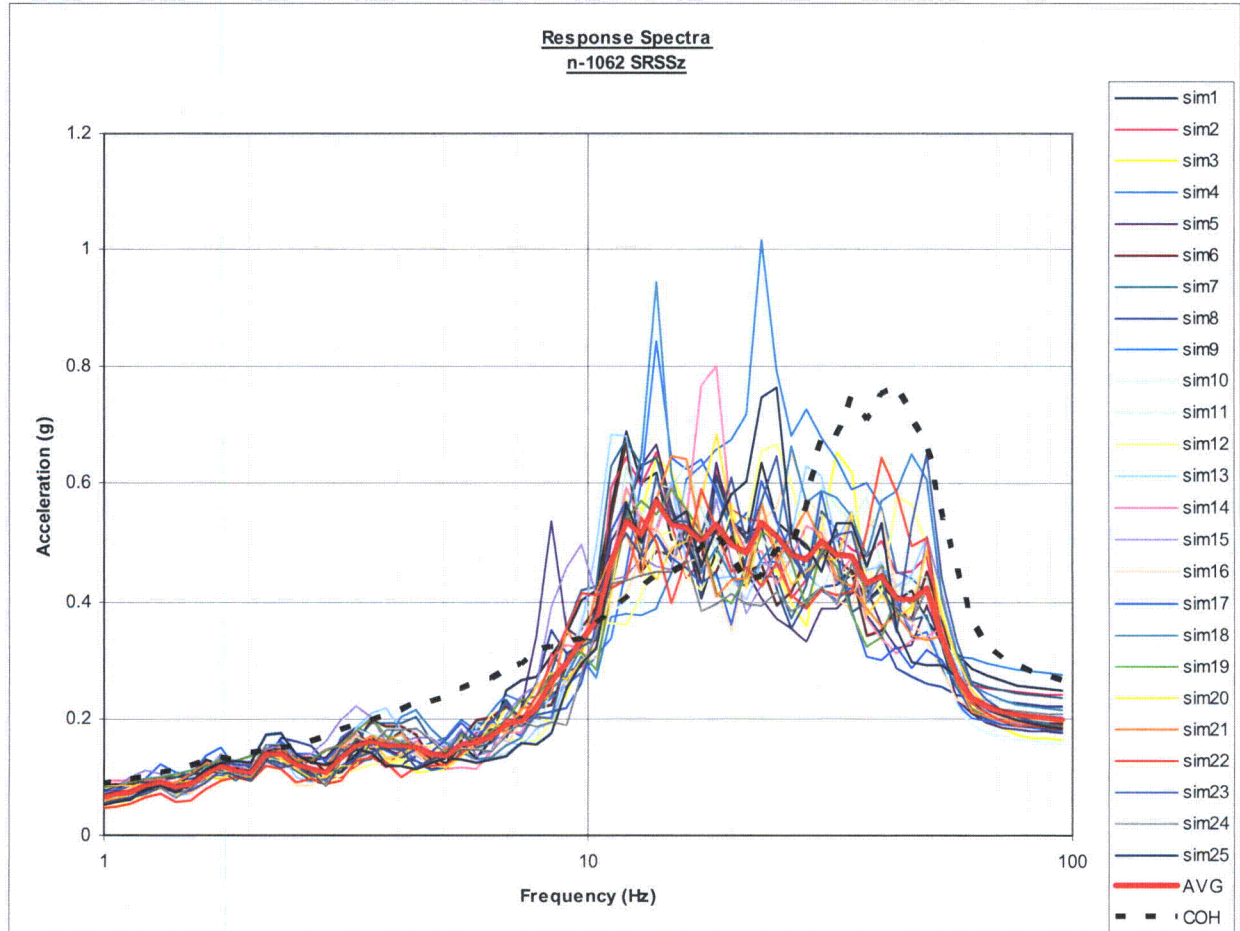
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-15: Node 1062-SRSS Y-Direction, Northeast Corner**

# AP1000 TECHNICAL REPORT REVIEW

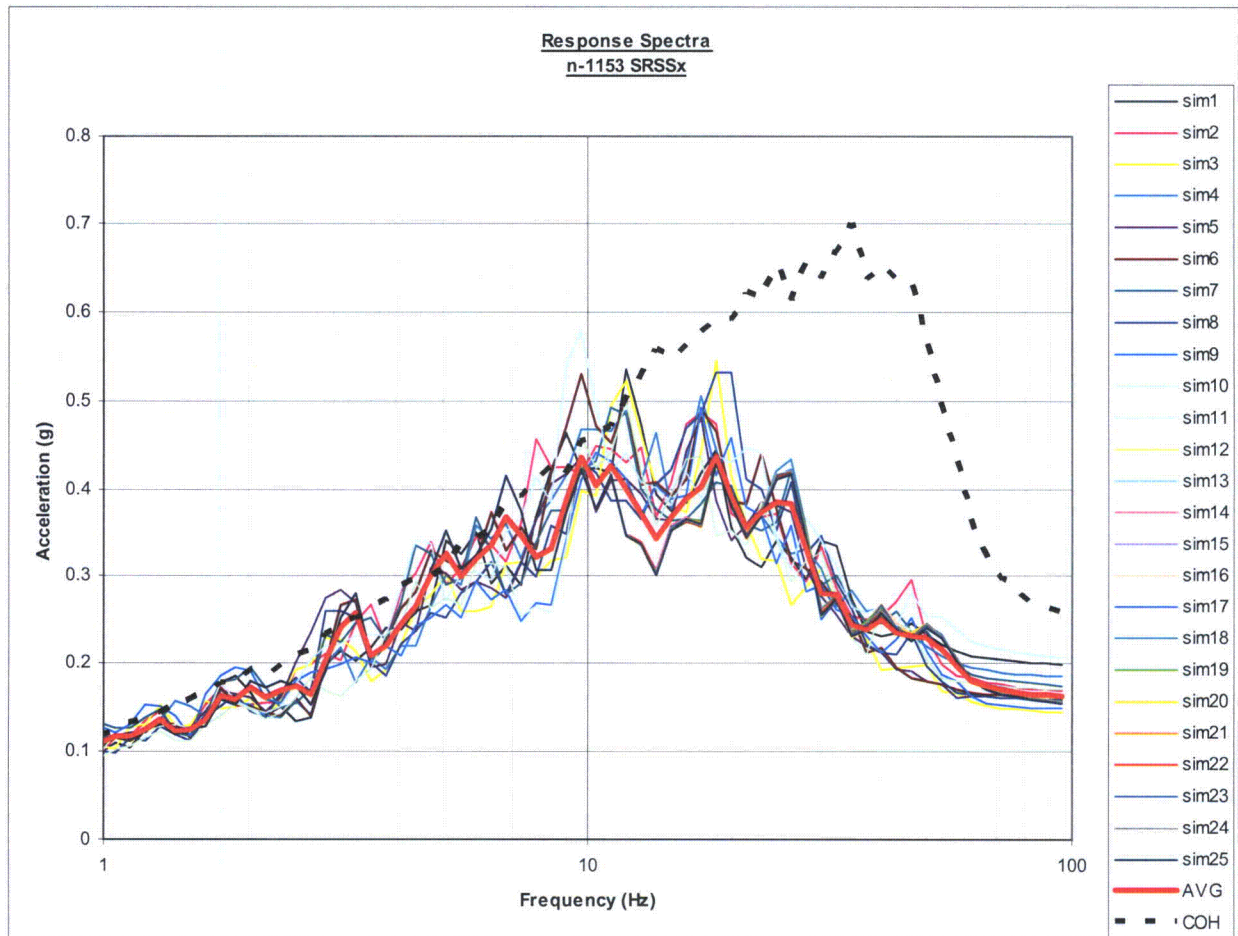
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-16: Node 1062-SRSS Z-Direction, Northeast Corner**

# AP1000 TECHNICAL REPORT REVIEW

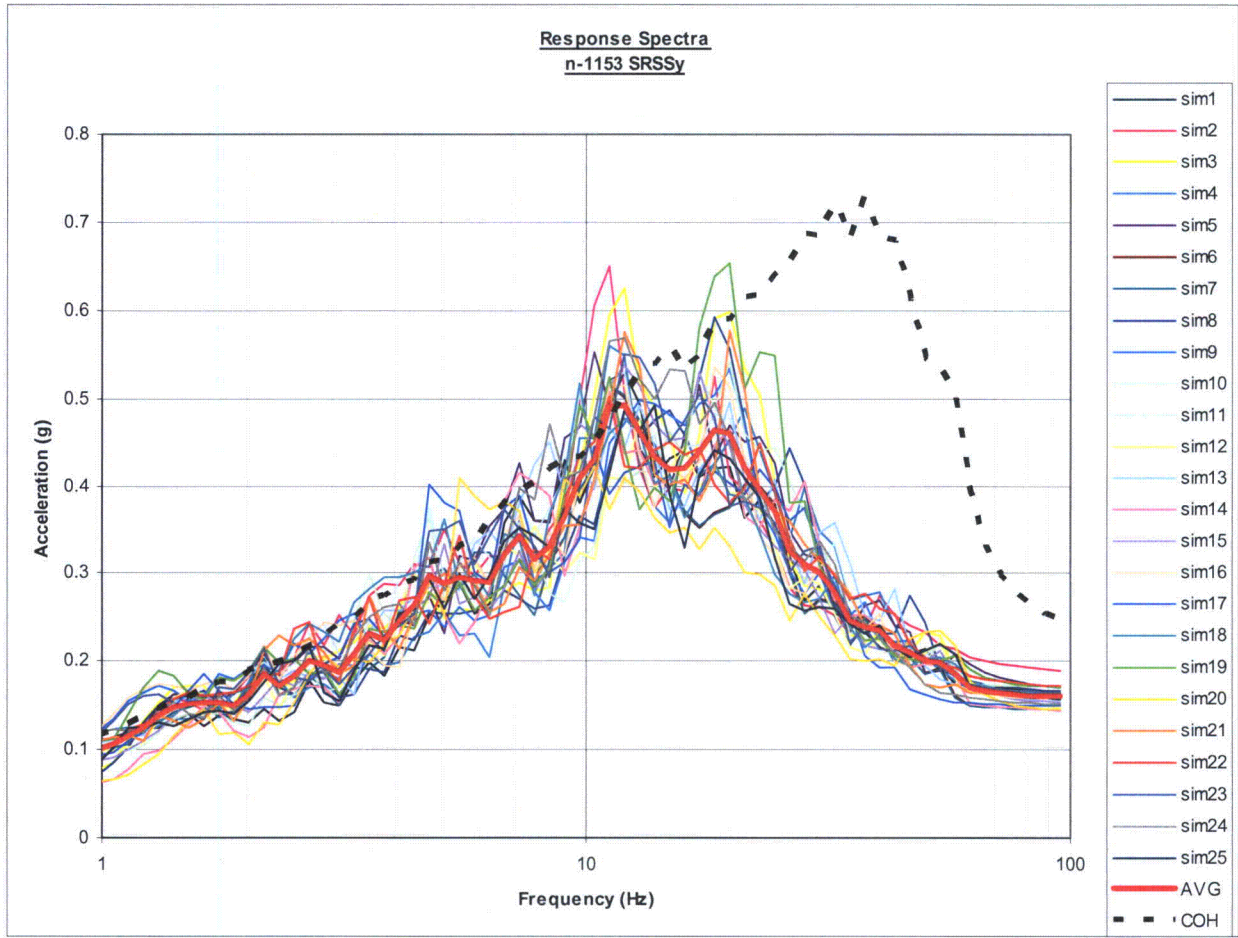
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-17: Node 1153-SRSS X-Direction, Center Basemat**

# AP1000 TECHNICAL REPORT REVIEW

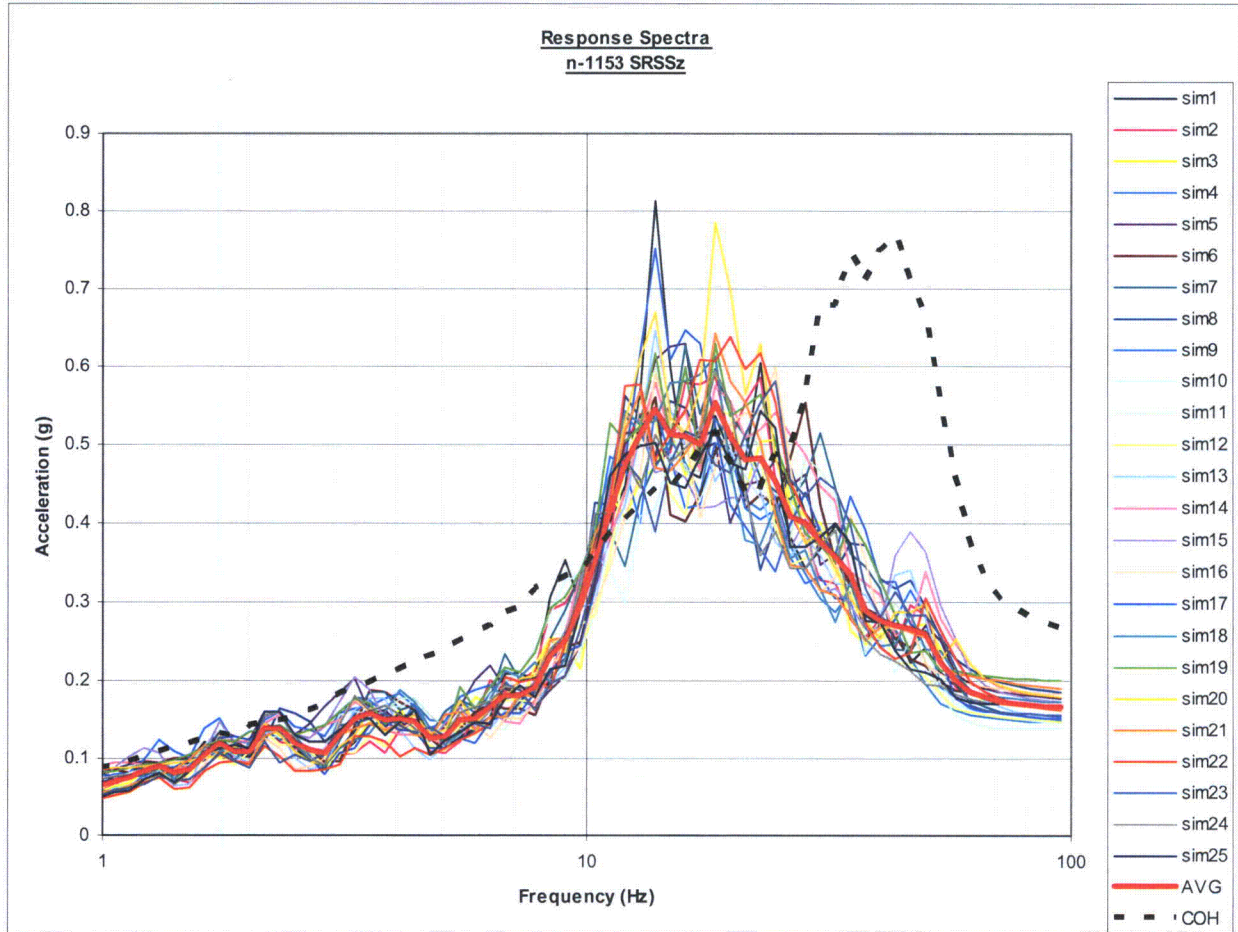
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-18: Node 1153-SRSS Y-Direction, Center Basemat**

# AP1000 TECHNICAL REPORT REVIEW

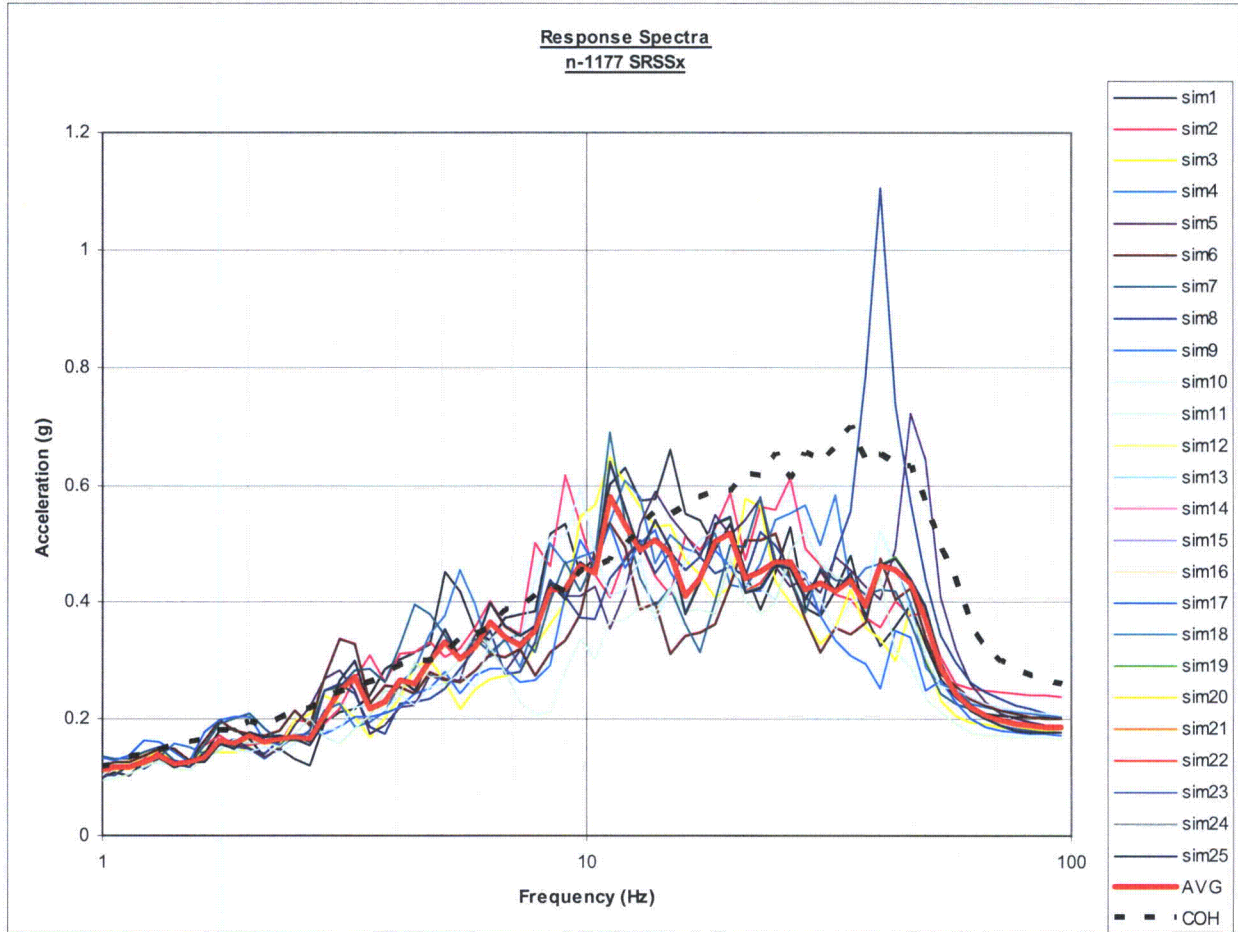
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-19: Node 1153-SRSS Z-Direction, Center Basemat**

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

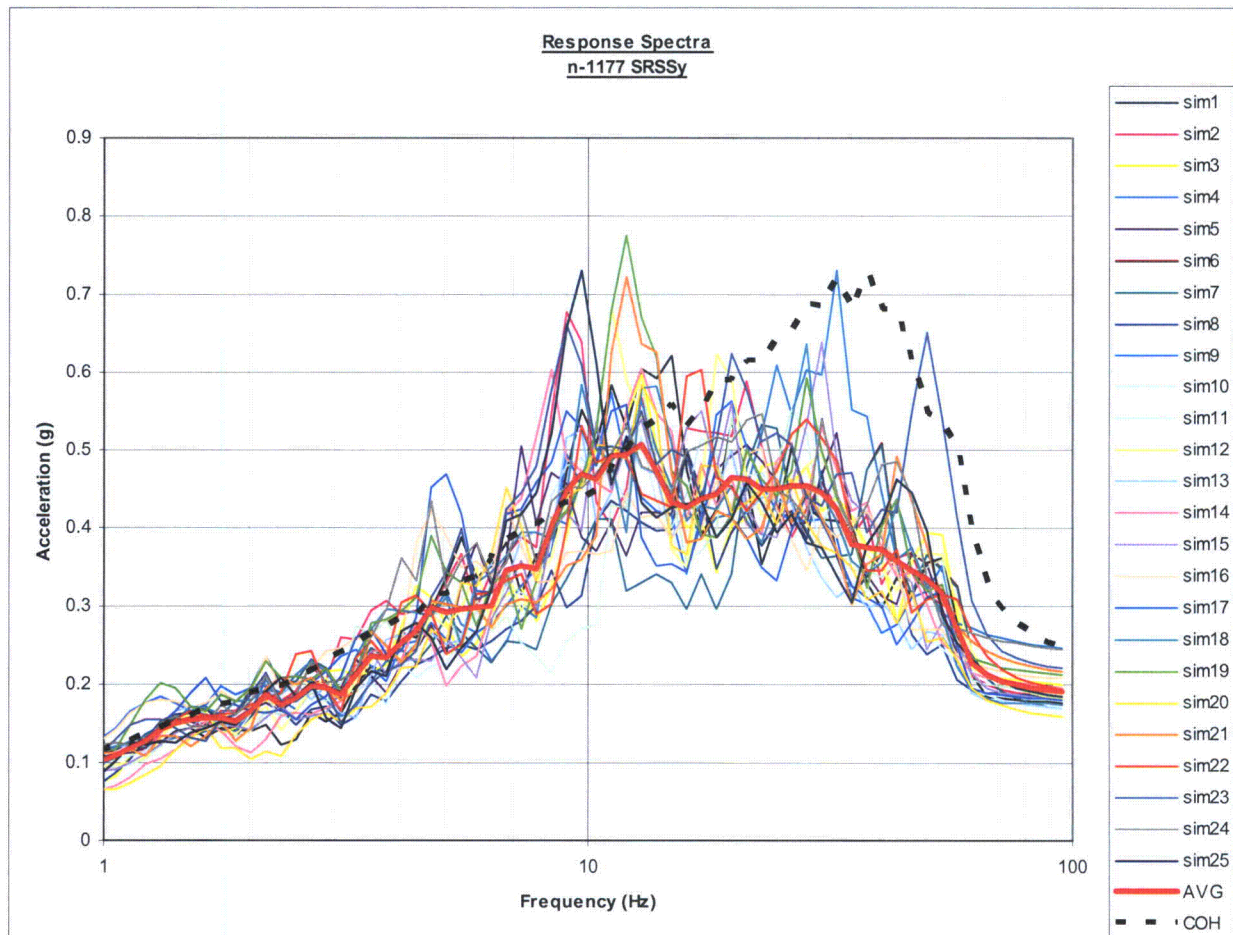


**RAI-SRP3.7.1-SEB1-11-20: Node 1177-SRSS X-Direction, Southwest Corner**



# AP1000 TECHNICAL REPORT REVIEW

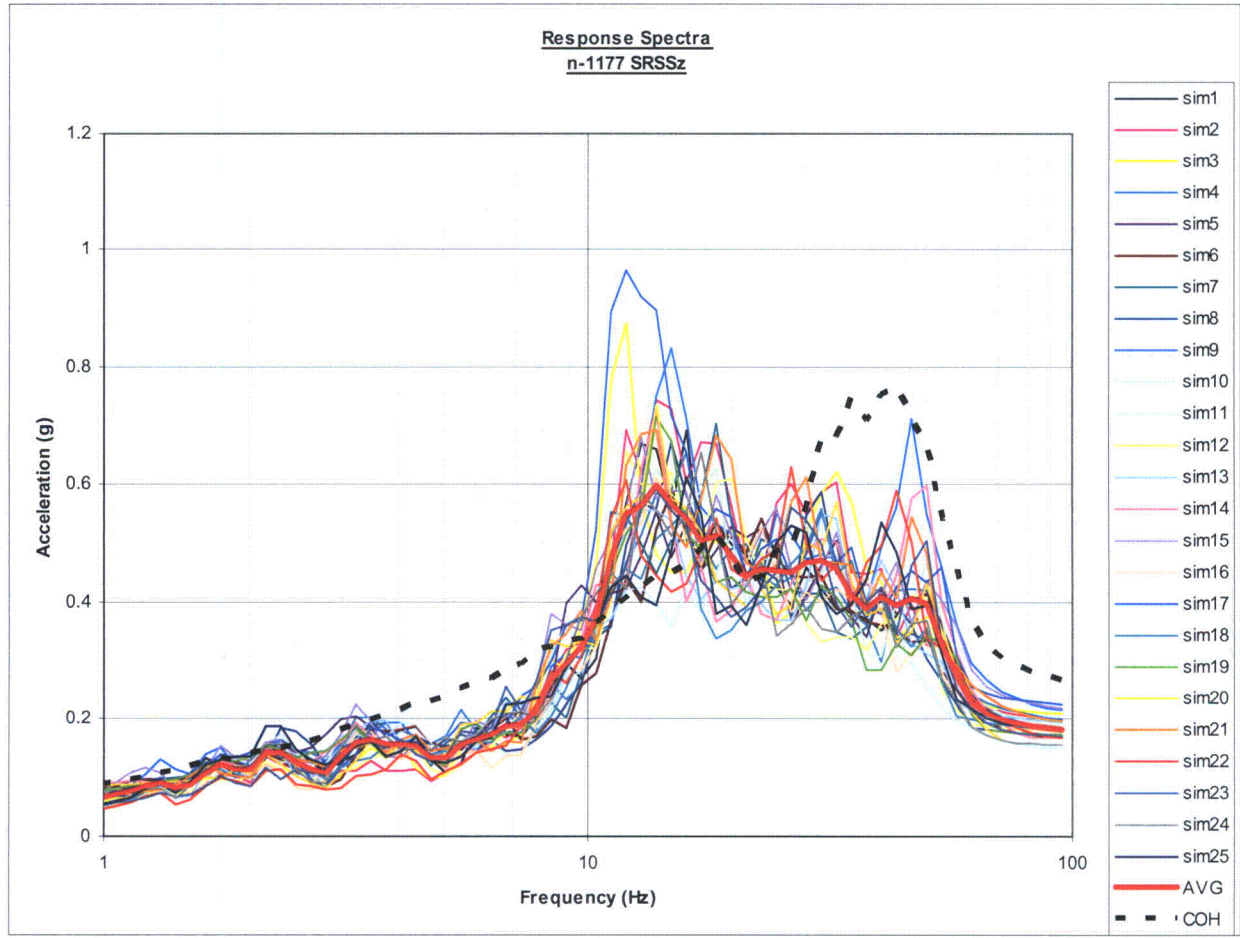
## Response to Request For Additional Information (RAI)



**RAI-SRP3.7.1-SEB1-11-21: Node 1177-SRSS Y-Direction, Southwest Corner**

# AP1000 TECHNICAL REPORT REVIEW

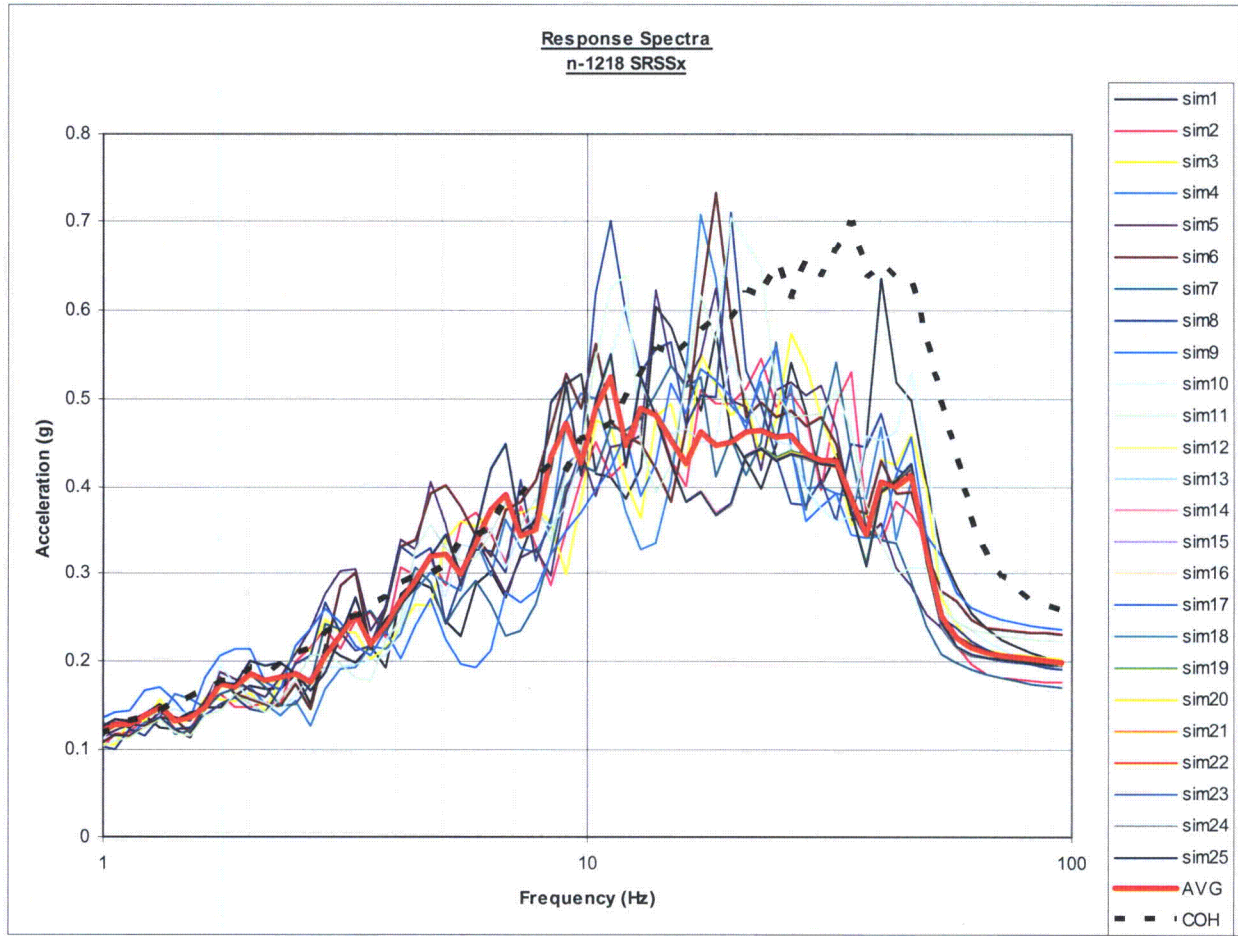
## Response to Request For Additional Information (RAI)



RAI-SRP3.7.1-SEB1-11-22: Node 1177-SRSS Z-Direction, Southwest Corner

# AP1000 TECHNICAL REPORT REVIEW

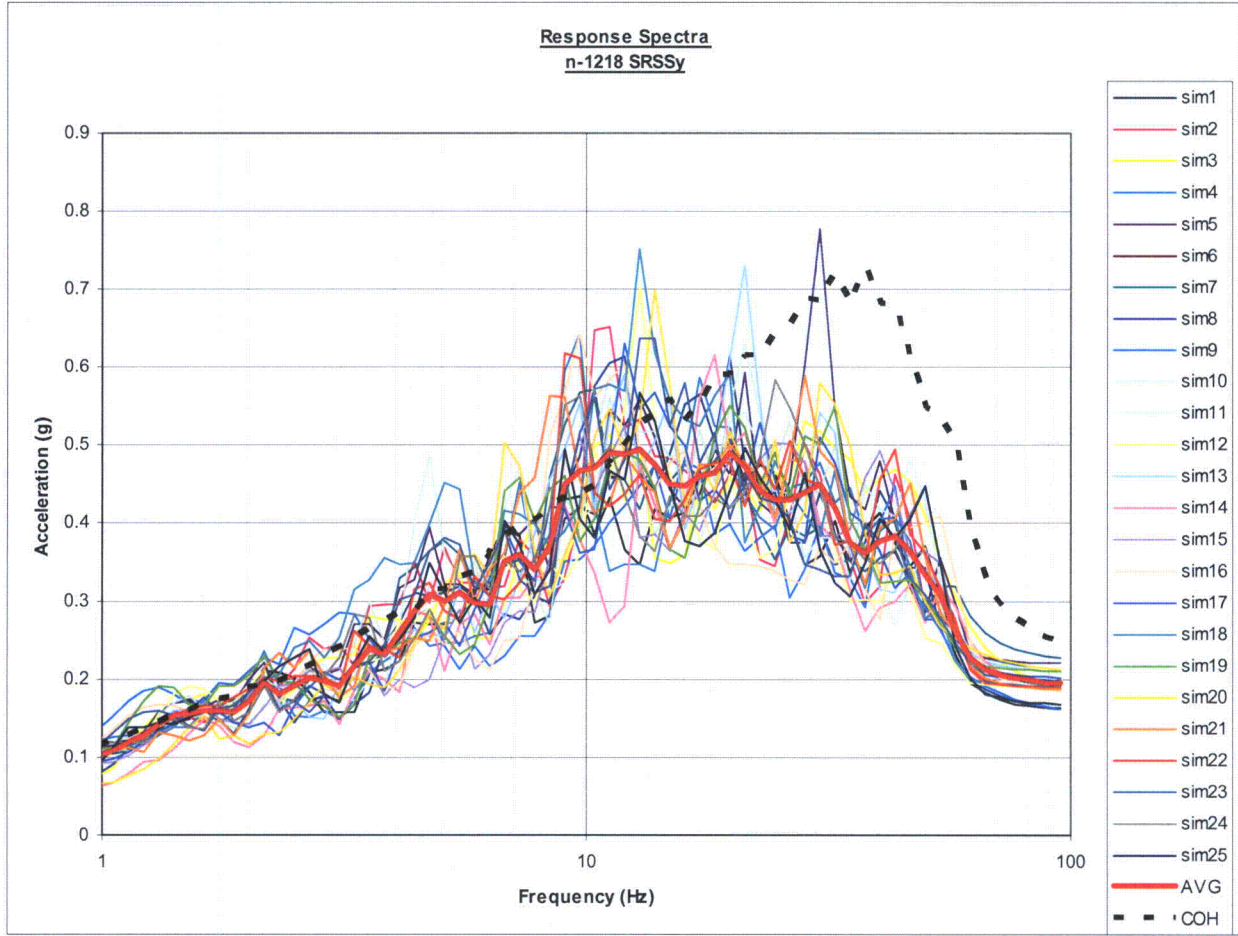
## Response to Request For Additional Information (RAI)



RAI-SRP3.7.1-SEB1-11-23: Node 1218-SRSS X-Direction, Northwest Corner

# AP1000 TECHNICAL REPORT REVIEW

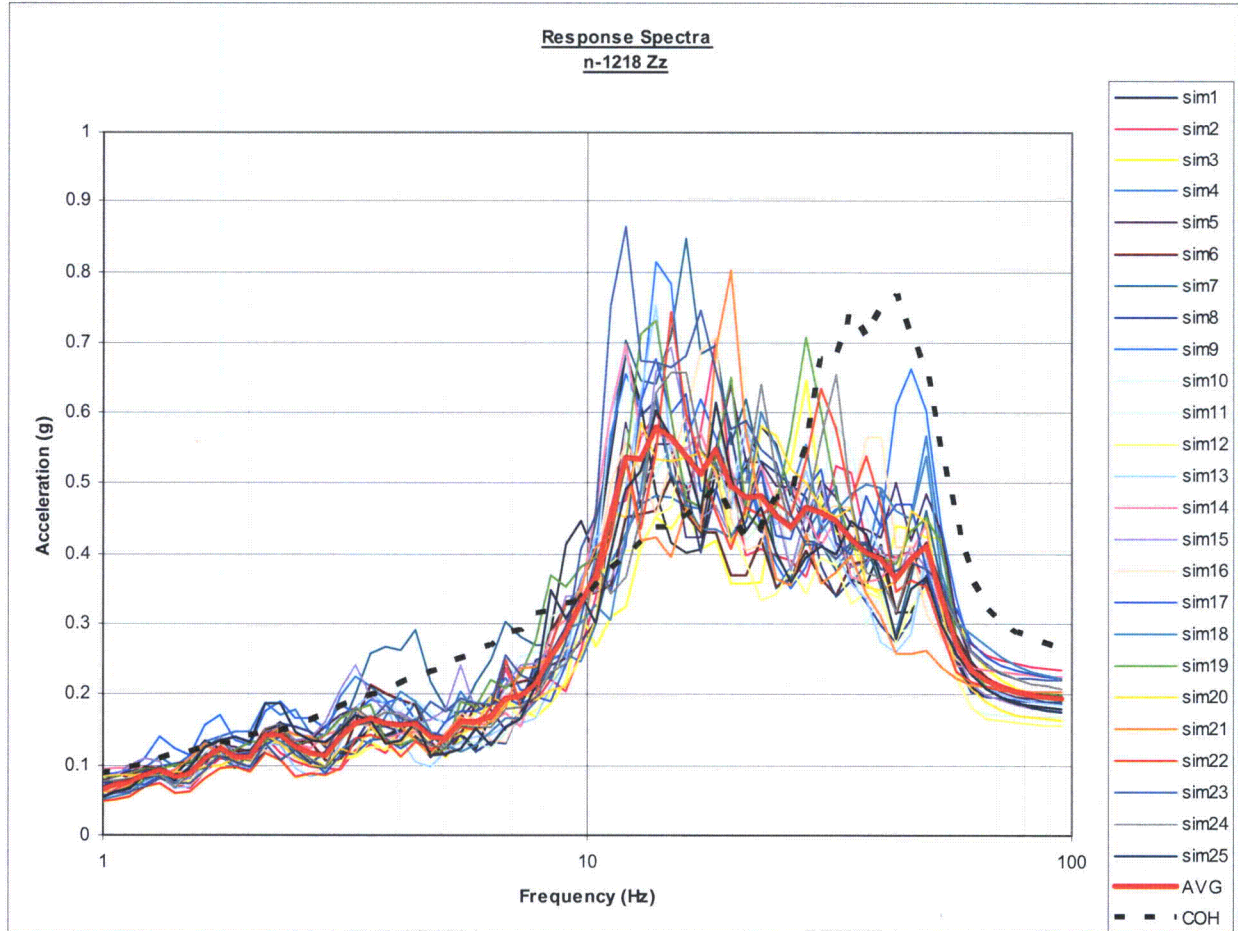
## Response to Request For Additional Information (RAI)



RAI-SRP3.7.1-SEB1-11-24: Node 1218-SRSS Y-Direction, Northwest Corner

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)



RAI-SRP3.7.1-SEB1-11-25: Node 1218-SRSS Z-Direction, Northwest Corner

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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Reference(s):

None

**Design Control Document (DCD) Revision:** None

**PRA Revision:** None

**Technical Report (TR) Revision:**

The figures presented in Revision 1 of this response request will be added to Section 5.2 of the TR-115 to supplement the existing data as Figures 5.2-7 and 5.2-8. Note that Figure 5.2-5 will be replaced by Figures RAI-SRP3.7.1-SEB1-11-4 to RAI-SRP-SEB1-11-6. Each figure will have the floor response spectra associated with the X, Y, and Z response. See also RAI-SRP-3.7.1-10 for additional changes to Section 5.2.

### **5.2 Comparison of CSDRS and HRHF Response Spectra**

To show the significance of the HRHF response spectra, the CSDRS and HRHF seismic responses are compared. Figures 5.2-1 through 5.2-8 (5% damping) compare the response spectra with coherent and incoherent considerations at a number of locations in the nuclear island. There are some exceedances, mostly above the 15 Hz region. These curves are typical of the plant comparative responses found throughout the plant.