



NRC Overview

1. Status of Regulatory Guidance 1.208
2. Staff's positions on CAV, sigma and coherency function
3. SRP 3.7 updates
4. ISG and seismic margin



NRC presenters

- RG 1.208 status, Annie Kammerer (RES)
- CAV and sigma, Yong Li (NRO)
- SRP 3.7updates, Sujit Samaddar (NRO)
- Coherency function, ISG and seismic margin, Goutam Bagchi (NRO)



Regulatory Guide 1.208 Update

- Final draft currently in legal review
- To be published March 2007
- Edited to make GMRS final product
$$\text{GMRS} = \text{UHRS} \times \text{DF}$$
- SSE developed in SRP Section 3.7.1
- Incorporated new definitions
- RG 1.165 still acceptable alternative



Regulatory Guide 1.208 Update

- Site response generalized & RVT included
- CAV continues to be included
- Sigma for CEUS (G1.3) accepted, but not in RG 1.208
- Location of GMRS clarified
- Definition of rock generalized
- NGA relationship referenced
- Use of past sources as starting point added
- Coherency not in RG 1.208; in SRP



Ground Motion Response Spectra (GMRS)

A site-specific ground motion response spectra characterized by horizontal and vertical response spectra determined as free-field motions on the ground surface or as free-field outcrop motions on the uppermost in-situ competent material using performance-based procedures. When the GMRS is determined as free-field outcrop motions on the uppermost in-situ competent material, only the effects of the materials below this elevation are included in the site response analysis.



Certified Seismic Design Response Spectra (CSDRS)

A site-independent seismic design response spectra that have been approved under Subpart B of 10 CFR Part 52 as the seismic design response spectra for an approved certified standard design nuclear power plant. The input or control location for the CSDRS is specified in the certified standard design.



Safe Shutdown Earthquake Ground Motion (SSE)

The vibratory ground motion for which certain structures, systems, and components are designed, pursuant to Appendix S to 10 CFR Part 50, to remain functional. The SSE for the site is characterized by both horizontal and vertical free-field ground motion response spectra at the free ground surface.



CAV Filtering

- RG 1.208 adopted CAV filtering in place of minimum magnitude truncation in hazard calculations
- Staff believes that CAV implementation needs further discussion
- RES/NRC is undertaking internal research to work on this task



Epsilon

- RG 1.208 also states that industry research results indicated that there is no technical basis to truncate lognormal distribution for ground motion at a specified number of standard deviation (epsilon)



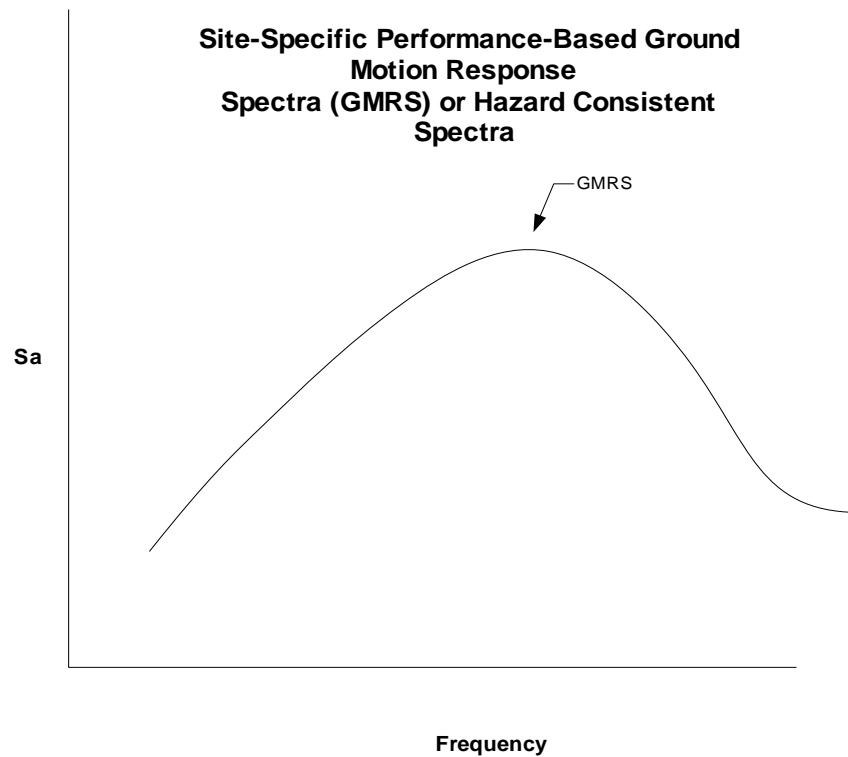
Sigma for CEUS Ground motion Attenuation Relationships

- NRC staff reviewed topical report G1.3 and accepted the new sigma value for the CEUS ground motion variability proposed by the industry



SRP Sections 3.7 Update

- Establishes a framework for review under Part 52
- Allows for greater flexibility in the review process
- No major changes to the deterministic analysis approaches
 - Will develop Interim Staff Guidance on issues that are not fully developed



Notes:

1. At the free surface or as outcrop motion in the uppermost in-situ competent material.
2. RG 1.165 goes beyond RG 1.208 and establishes a SSE for both Part 52 and part 50 process

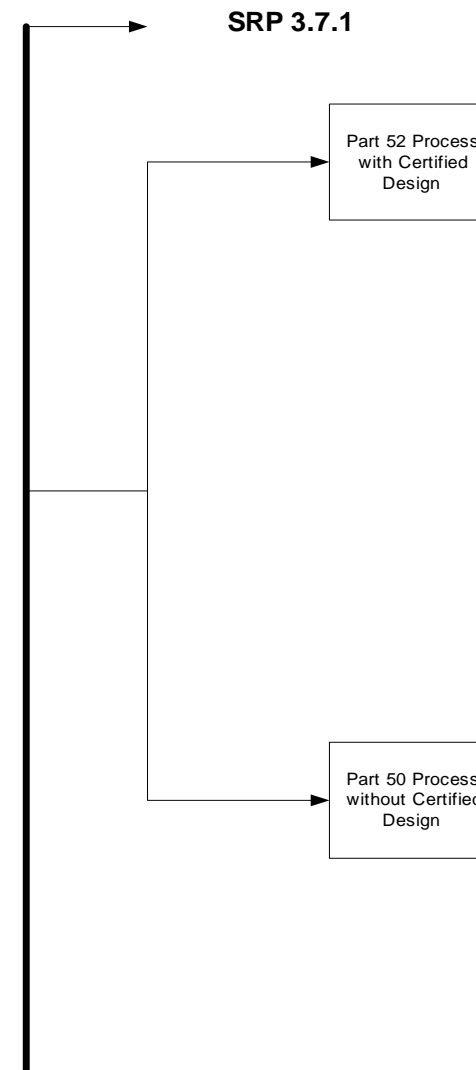


Figure 1

SRP 3.7.1 - Part 52 Process with Standard Design

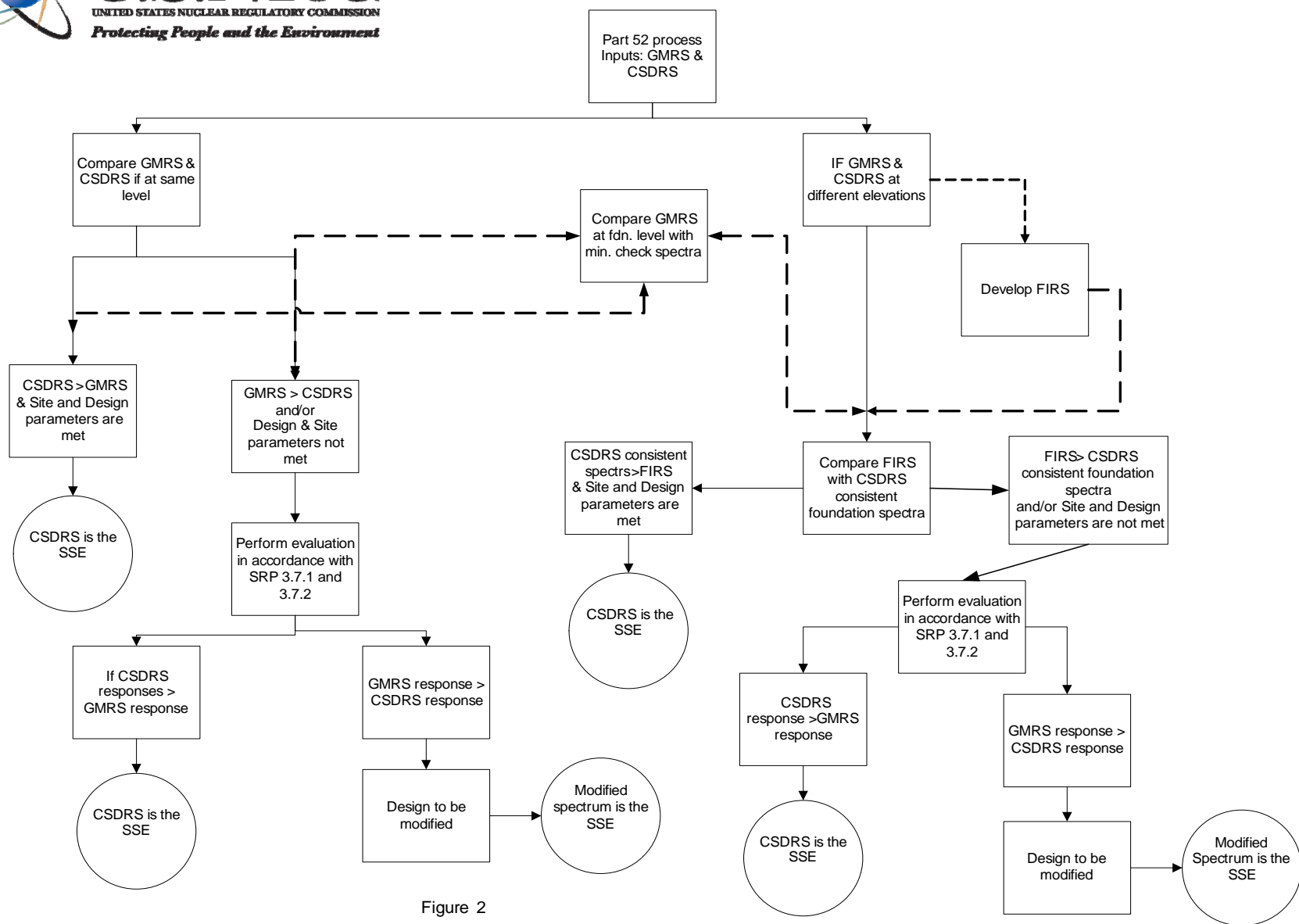


Figure 2

Process when a certified design is not used

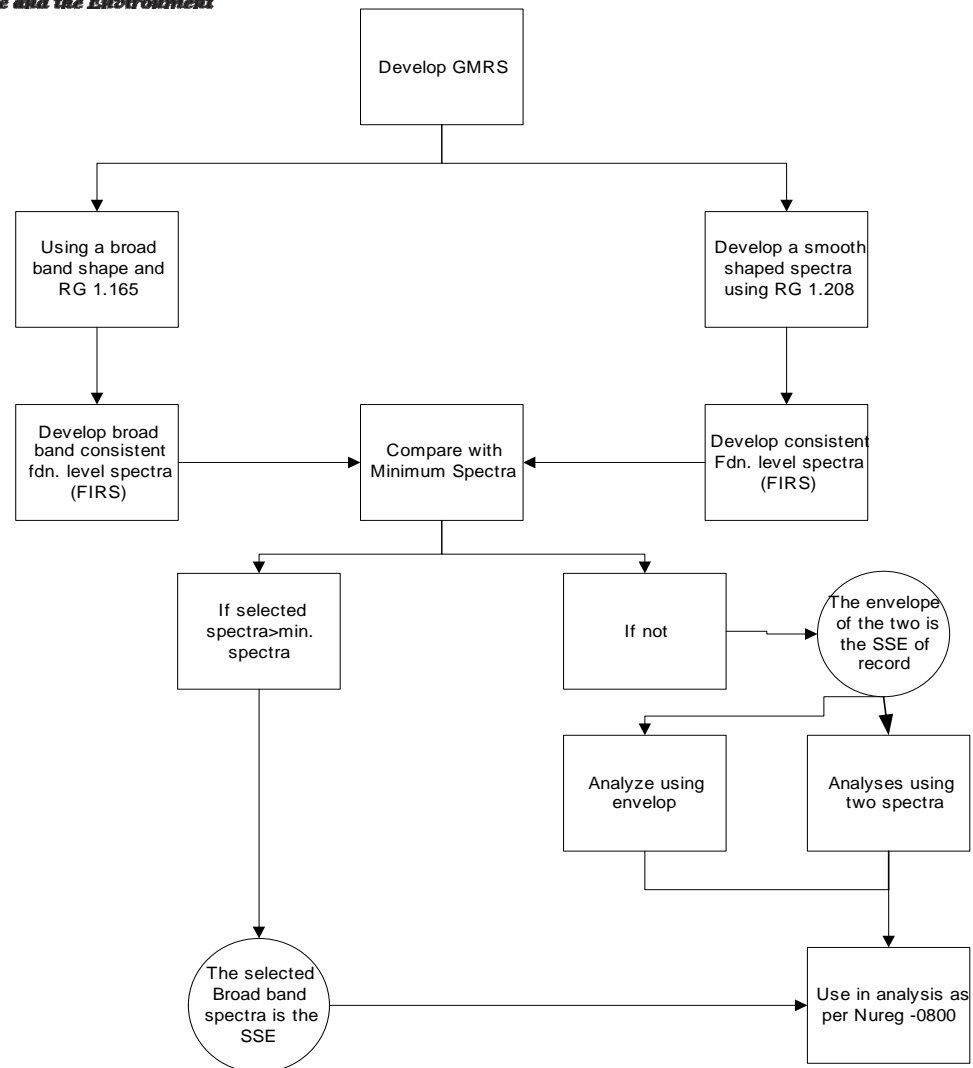


Figure 3

SRP 3.7.1 & 3.7.2 evaluations

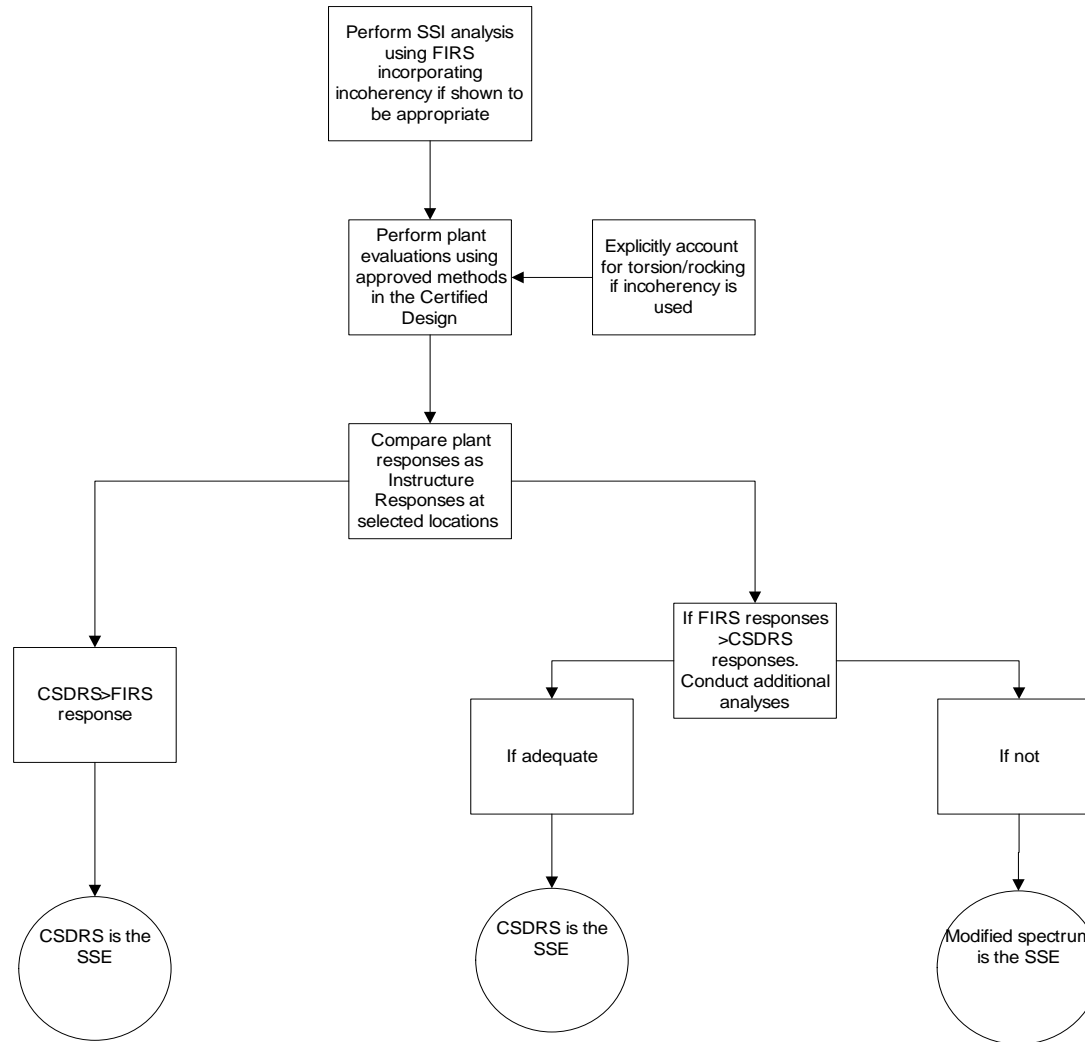


Figure 4



Coherency Function (CF) Status

- During 12/21/06 meeting there was a “common understanding” on developing a revised coherency function for further NRC review
- A CF for vertical motions to be developed
- A report detailing both above topics to be provided to NRC for review



Coherency Function Status (Contd.)

- A dataset based on the recordings used to develop the CF to be provided to NRC for review (including A,V,D time histories; cross correlations; phase differences, etc.)



Coherency Function Status (Contd.)

- SASSI to be validated against CLASSI results
- A final report on the EPRI SSI results including case history is to be provided
- Industry to develop user guidance for SASSI users to ensure proper usage
- Each new user of SASSI must show validation against CLASSI case history



Additional Key Points

- Coherency is to be used in individual building seismic response analysis only
- CF must be implemented in a validated SSI program
- Response checks on locations where overall building rotation and rocking responses would be significant



Interim Staff Guidance

- To be based on staff review of NEI/EPRI reports on coherency function and its implementation
- Modeling and response parameters of interest
- Effects of high frequency input and response
- Interaction through pre-application meetings and further generic technical studies



AP 1000 Site Evaluations

- Review under amendment of AP1000 (DC) rule
- Use of coherency for AP 1000
 - Approved coherency function (CF)
 - Validated SSI package
 - Response locations and parameters of interest to be proposed and justified
 - CSDRS of record



Seismic Margins

- It is a key element of performance-based seismic demand assignment
- Plant level margin at $1.67 \times \text{SSE}$ of record as the plant HCLPF value
- For certified designs it is Certified Seismic Design Response Spectrum (CSDRS)

Seismic Margins

- SSC margin: qualified by test or analysis
- Qualified by analysis:
 - Probabilistic approach using variable separable method for SSC capacity
 - Conservative Deterministic Failure Margin approach using code based factors
 - Push-over analysis for HCLPF



Seismic Margins

- Time to take another look at methods?
 - Envelope CSDRS shape is challenging
 - Need to incorporate newer evaluation methods
 - Update guidance?