Department of Energy
National Nuclear Security Administration
Washington, DC 20585

April 20, 2001

The Honorable John T. Conway
Chairman
Defense Nuclear Facilities Safety Board
625 Indiana Avenue, NW - Suite 700
Washington, DC 20004

Dear Mr. Chairman:

SUBJECT: Seismic Design Criteria for the Pit Disassembly and Conversion Facility

The Office of Fissile Materials Disposition (NN-60) is currently designing two plutonium disposition facilities, namely, the Pit Disassembly and Conversion Facility (PDCF) and the MOX Fuel Fabrication Facility (MFFF), to be built in the F-Area of the Savannah River Site (SRS). The PDCF will be self-regulated by DOE with the Defense Nuclear Facilities Safety Board (DNFSB) providing the oversight function while the MFFF will be licensed and regulated by the Nuclear Regulatory Commission (NRC). Since these two facilities are co-located, the Department has decided to adopt similar seismic design criteria for the two facilities.

To facilitate the licensing of the MFFF we have decided to use the seismic response spectrum that was accepted by the NRC to license Plant Vogtle and apply it to the design of the PDCF. This seismic design criteria, as applied to the PDCF (a PC3 facility) is conservative relative to that committed by the Department for future new facilities at SRS. The Department may choose to provide additional conservatism in the design of critical equipment such as gloveboxes. Figure 1 shows the NRC RG 1.60 horizontal free-field spectrum we plan to use. For the vertical component we are currently using the corresponding horizontal component scaled by two thirds throughout the entire range of frequency. A study is underway to confirm the appropriateness of the vertical component.

For geotechnical assessments for the PDCF, we have adopted an approach based on previous work conducted by the Department. The SRS PC3 bedrock motion (time history) is scaled by 1.25 so that when amplified through the site soil profile, the resulting ground motion will have 0.20g Peak Ground Acceleration. Assessments of dynamic soil response, including liquefaction evaluation, will

utilize the scaled PC3 bedrock motion input. This work will be supplemental by a probability of liquefaction analysis to ensure that adequate margin exists in the standard geotechnical assessments. The technical basis for this time history is included in Attachment A.

The above approach will also provide us confidence that any perceived difference in the use of NRC RG 1.60 spectrum for structural/systems analysis and the scaled PC3 bedrock motion for geotechnical assessments has no safety significance.

The above-described position forming the basis for the seismic design of the PDCF is consistent with the briefing presented by this Office to the Board on December 15, 2000. Should you have any questions, please contact me at 202-586-2695.

Sincerely,

Edward J. Siskin
Acting Assistant Deputy Administrator
Office of Fissile Materials Disposition

cc: K. Baker, NN-1
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Enclosure: RG 1.60 horizontal free-field spectrum (Figure 1)
Technical basis for time history (Attachment A)

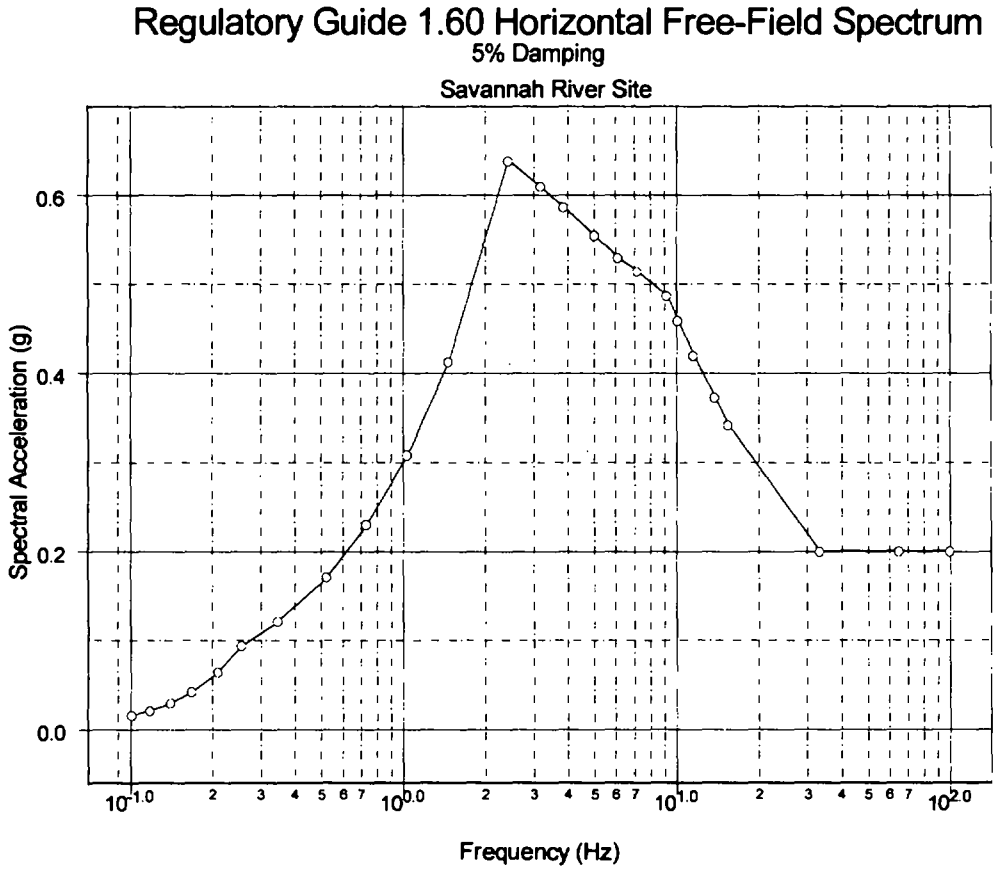
Regulatory Guide 1.60 Horizontal Free-Field Spectrum
5% Damping
Savannah River Site
Spectral Acceleration (g)
0.6
0.4
0.2
0.0
10-1.0
2
3
4
5
6
7
100.0
2
3
4
5
6
7
101.0
2
3
4
5
6
7
102.0
Frequency (Hz)

Figure 1

Attachment A

Development of the SRS PC3 Rock Acceleration Time History

The SRS PC3 acceleration time history was generated using a time domain spectral matching procedure. The procedure can modify the original input time history to match the target spectrum while maintaining the overall non-stationary characteristics of the original time history. This procedure is based on the methodology proposed by Lilhanand and Tseng (1988).

The reference acceleration time history was a random phase time history provided by Dr. Carl Costantino. The duration enveloping parameters recommended by ASCE Standard 4-86 (ASCE, 1986) were used when developing the time history (i.e., 1 second rise time, 6 seconds strong motion and 4 seconds decay time). The 5% critically damped target, uniform-hazard rock response spectrum is from (WSRC 1997).

The SRS PC3 acceleration time history was required to produce a response spectrum that matched the target spectrum within tolerances specified by NRC S.R.P. 3.7.1 criteria (U.S. Nuclear Regulatory Commission, 1989) at the 75 NRC frequencies. The acceleration time history was also baseline corrected.

References:

American Society of Civil Engineers (1986). Seismic Analysis of Safety-Related Nuclear Structures and Commentary on Standard for Seismic Analysis of Safety Related Nuclear Structures, ASCE Standard 4-86, New York, New York, September 1986.

Lilhanand, K. and W. S. Tseng (1988).
Development and application of realistic time histories compatible with multiple-damping design spectra, Proceedings of Ninth World Conference on Earthquake Engineering, Vol. II, Tokyo, Japan, 819-824.

U.S. Nuclear Regulatory Commission (1989). NRC S.R.P. 3.7.1. Seismic Design Parameters.

WSRC (1997). Uniform Hazard Scaling of Rock Spectra (U), Calculation No. T-CLC-G-00063, Rev. 2, Feb. 1997