



NUCLEAR ENERGY INSTITUTE

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March 30, 2006

Mr. Eugene V. Imbro  
Chief Mechanical and Civil Engineering Branch  
Office of Nuclear Reactor Regulation  
U.S. Nuclear Regulatory Commission  
Washington, DC 20555-0001

**PROJECT 689**

**SUBJECT:** Industry Proposal on Seismic Core Damage Frequency Target Value

Dear Mr. Imbro:

In September 2005, NEI submitted EPRI report 1012044 entitled "*An Assessment of a Performance-Based Approach for Determining the SSE Ground Motion for New Plant Sites*", to the NRC. The report documents an evaluation of a method for calculating seismic design spectra as recommended in the national consensus standard, ASCE 43-05, "*Seismic Design Criteria for Structures, Systems, and Components in Nuclear Facilities*." The report compared design spectra calculated using the prescribed method, to existing design spectra for 28 Central and Eastern U.S. sites.

In recent public meetings the NRC staff has stated that the performance-based approach is an acceptable alternative to the Probabilistic Seismic Hazard Assessment (PSHA) method. In October of 2005, NRC staff requested that the industry modify the ASCE methodology to replace the target metric of frequency of seismic induced onset of significant inelastic deformation (FOSID) criterion with one related to seismic core damage frequency.

The industry is proposing a seismic core damage frequency target metric value of  $5E-6/y$  for use with the performance-based approach.

In the NRC policy statement, *Regulation of Advanced Nuclear Power Plants*, the Commission stated that it expects advanced reactors will provide enhanced margins of safety. The Table 2.2 of NUREG-1742 shows the mean seismic core damage

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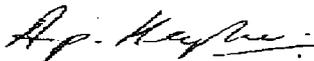
frequency for existing plants, which performed seismic PRAs using EPRI type hazard curves. The median value is  $1.2E-5/\text{yr}$  and the mean value is  $2.5E-5/\text{y}$ . A target value of  $5E-6/\text{yr}$  provides additional margin compared with existing plants and satisfies the Commission's expectations voiced in its policy statement.

The enclosed Figure 1 and Table 1 are based on Table 2.2 of NUREG-1742 and provide a graphic of the industry's proposal. We have tested the proposed seismic core damage frequency metric against 27 of the Regulatory Guide 1.165 reference-plant sites.

The efforts of the NRC staff in resolving this complex issue have been commendable. The open and constructive regulatory interactions have enabled the project to move forward at a pace that will give confidence to the upcoming early site permit and combined license applicants.

Please address any questions you may have on this proposal to Cedric Jobe at (202) 739-8128; [cij@nei.org](mailto:cij@nei.org) or Adrian Heymer at 202-739-8094; [aph@nei.org](mailto:aph@nei.org).

Sincerely,

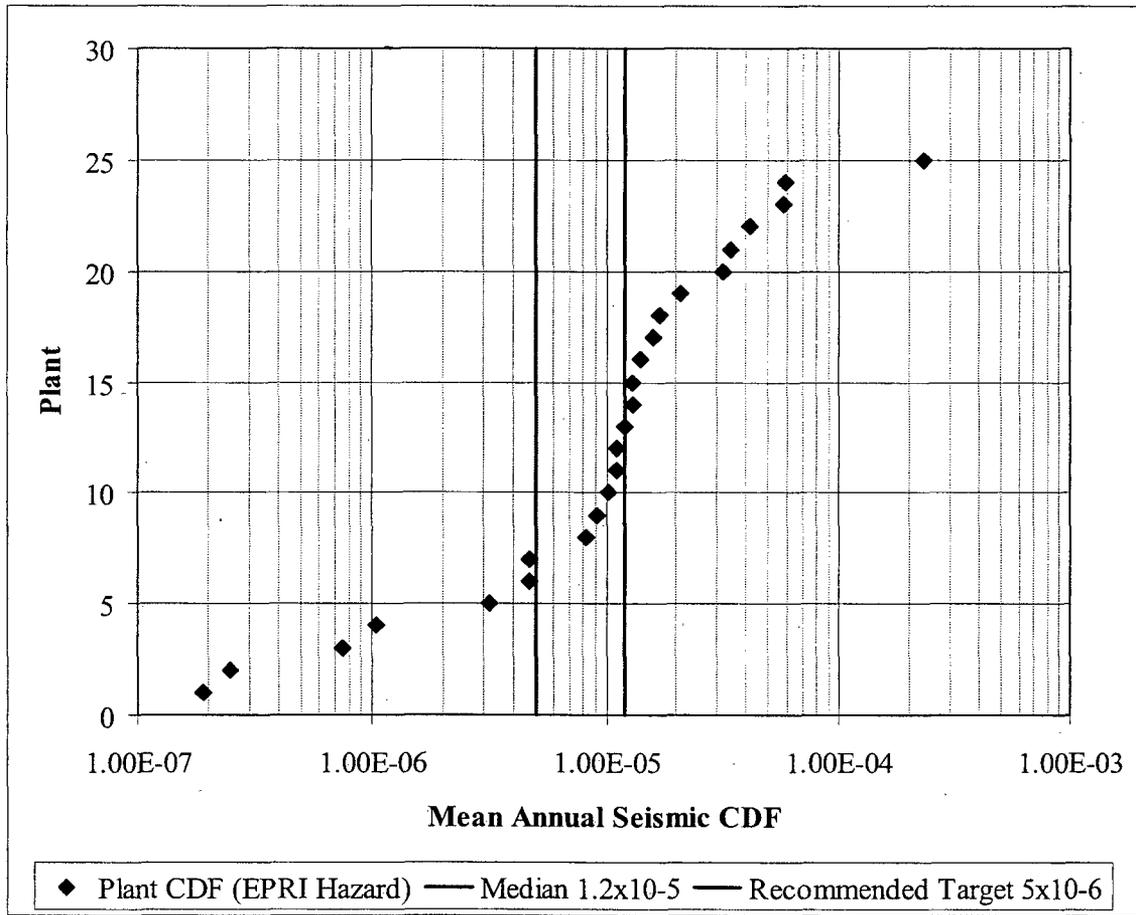


Adrian P. Heymer

Enclosures

c: Dr. William D. Beckner, U.S. Nuclear Regulatory Commission  
Dr. Andrew J. Murphy, U.S. Nuclear Regulatory Commission  
Document Control Desk

Figure 1: Industry Proposed Seismic CDF Target =  $5 \times 10^{-6}$



**Table 1: SCDF for Plants Performing Seismic PRA from Table 2.2 from NUREG 1742, Volume 2**

	<b>Plant</b>	<b>Seismic CDF/Year (EPRI Hazard)</b>
1	South Texas Project 1 & 2	1.90E-07
2	Nine Mile Point 2	2.50E-07
3	La Salle 1 & 2	7.60E-07
4	Hope Creek	1.06E-06
5	D.C. Cook 1 & 2	3.20E-06
6	Salem 1 & 2	4.70E-06
7	Oyster Creek	4.74E-06
8	Surry 1 & 2	8.20E-06
9	Millstone 3	9.10E-06
10	Beaver Valley 2	1.03E-05
11	Kewaunee	1.10E-05
12	McGuire 1 & 2	1.10E-05
13	Seabrook	1.20E-05
14	Beaver Valley 1	1.29E-05
15	Indian Point 2	1.30E-05
16	Point Beach 1 & 2	1.40E-05
17	Catawba 1 & 2	1.60E-05
18	San Onofre 2 & 3	1.70E-05
19	Columbia	2.10E-05
20	TMI 1	3.21E-05
21	Oconee 1, 2, and 3	3.47E-05
22	Diablo Canyon 1 & 2	4.20E-05
23	Pilgrim 1	5.80E-05
24	Indian Point 3	5.90E-05
25	Haddam Neck	2.30E-04
	<b>Mean</b>	<b>2.50E-05</b>
	<b>Median</b>	<b>1.20E-05</b>
	<b>Standard Deviation</b>	<b>4.58E-05</b>
	<b><i>New Plant Target Metric for performance-based approach</i></b>	<b><i>5.00E-06</i></b>