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GI 199: Implications of Updated Seismic Hazard Estimates

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- Recent developments in seismic source characterization and in ground motion predictive equations suggest our estimates of seismic hazard in the central and eastern U.S. (CEUS) may have increased relative to previous estimates.

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- The rate of earthquake occurrence in certain areas is now perceived to be greater than suggested by previous estimates (Charleston, New Madrid, Wabash Valley).
- Current estimates of earthquake occurrence in Charleston (1/550 years) and New Madrid (1/500 years) are several times more frequent than values used in the 1980's.
- New sources have been identified (Saline River fault) or better characterized (Wabash Valley).

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- Application of revised ground motion predictive equations (GMPEs) would result in different hazard estimates at virtually all NPP sites in the CEUS.
- The GMPEs used in the EPRI (1989) study modeled the variability in ground motions as a constant independent of magnitude, distance, and frequency. Recent relationships predict generally higher estimates of uncertainty that depend on magnitude, distance and frequency.

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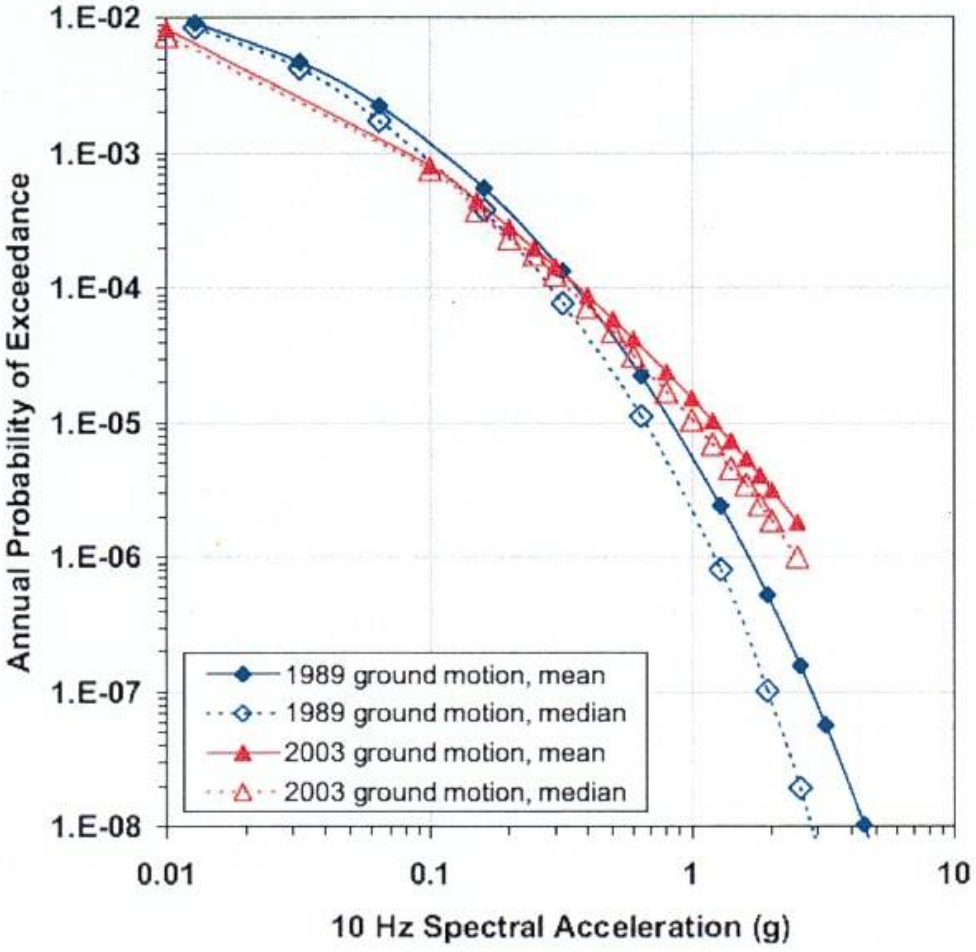

igure 2.5-44. Sensitivity of 10 Hz Seismic Hazard to 1989 and 2003 Ground Motion Models

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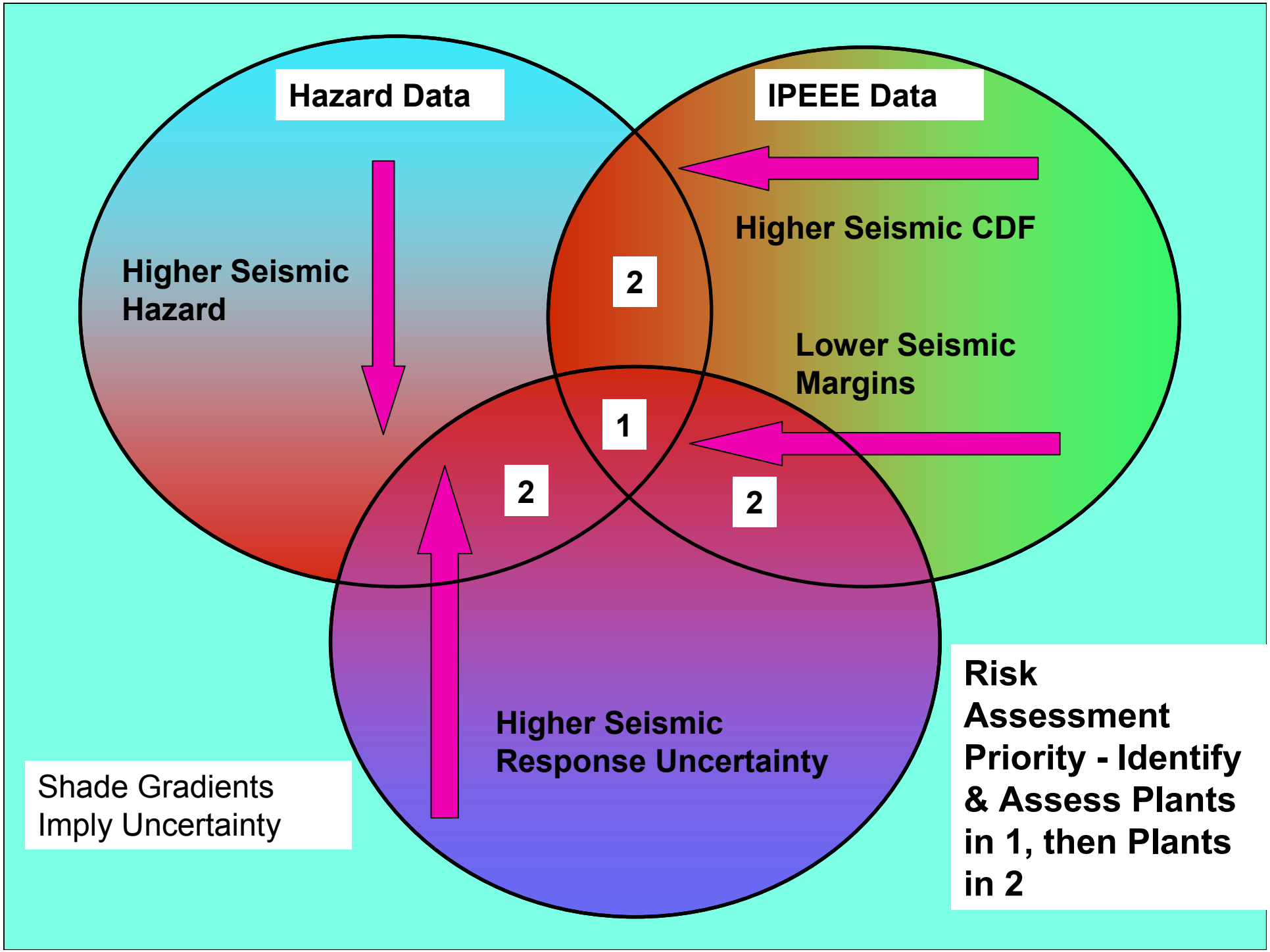
- The Individual Plant Examination of External Events (IPEEE) program was conducted in the 1990's to identify plant-specific vulnerabilities to severe external events, report the results and any improvements and/or corrective actions to the NRC.
- IPEEE considered the implications of Beyond Design Basis events. The IPEEE program relied on existing SSE's, EPRI (1989), and LLNL (1993) hazard estimates to perform evaluations.


Hazard Data
IPEEE Data
Higher Seismic Hazard
Higher Seismic CDF
2
Lower Seismic Margins
1
2
2
Higher Seismic Response Uncertainty
Shade Gradients Imply Uncertainty
Risk Assessment Priority - Identify & Assess Plants in 1, then Plants in 2

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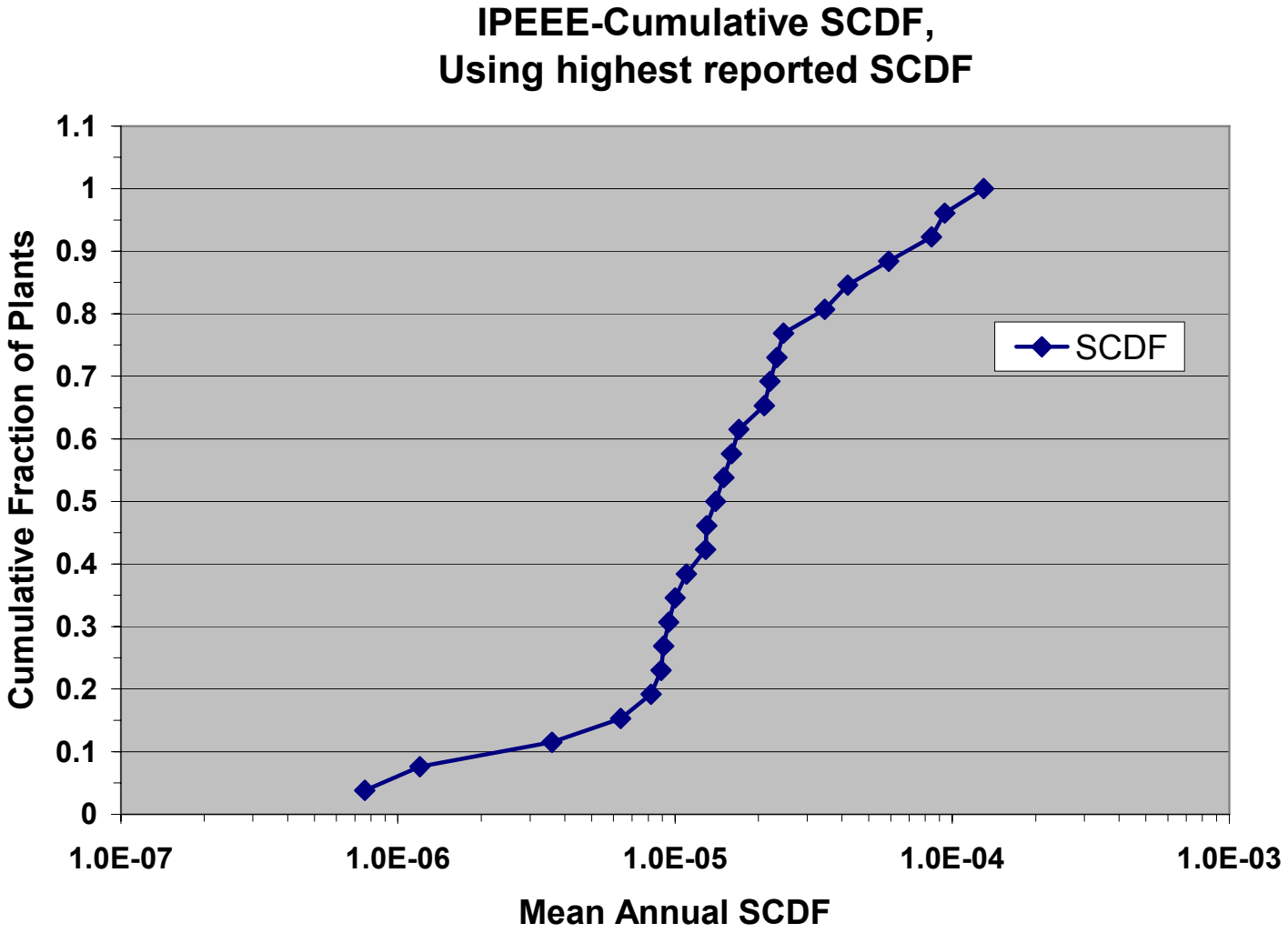

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BACKGROUND

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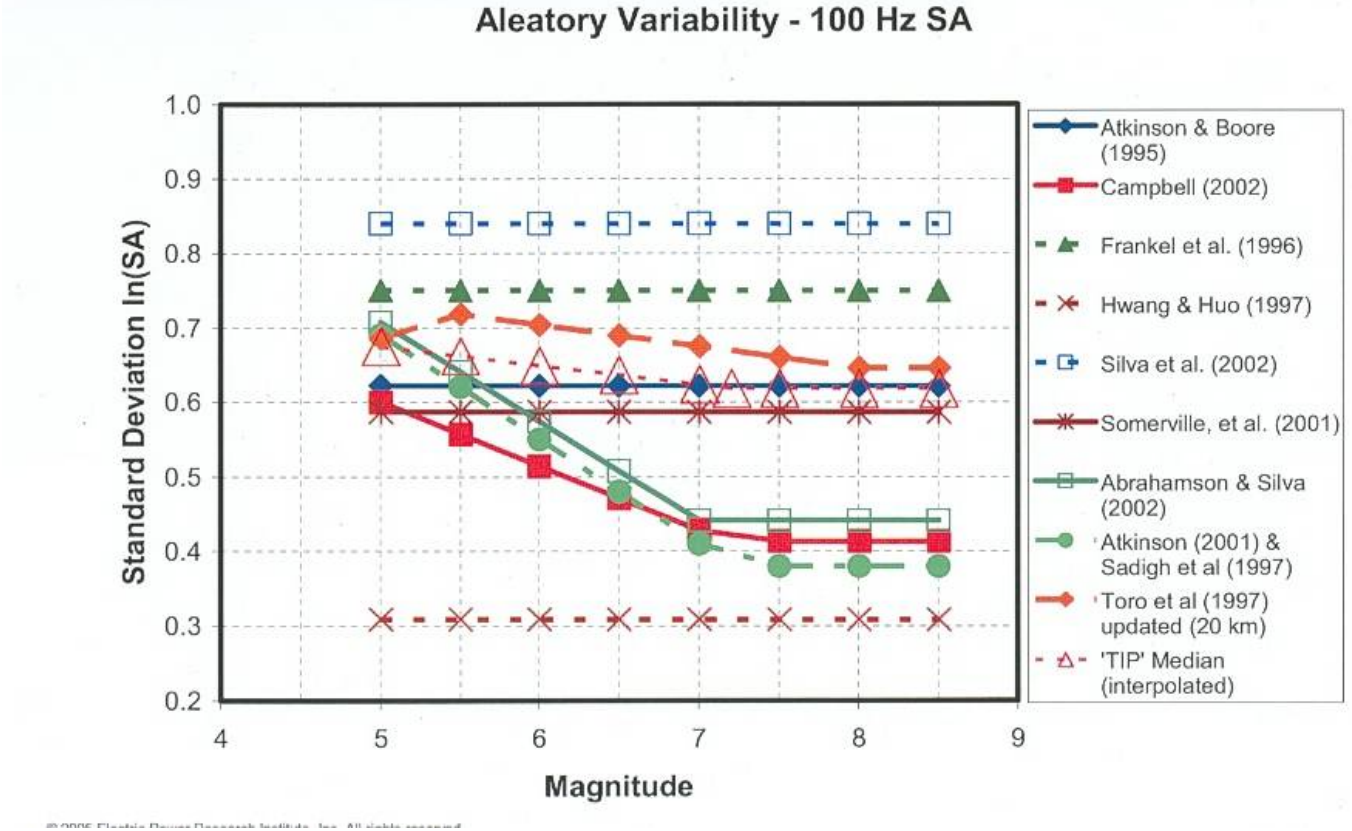
Standard Deviation Models Considered in EPRI (2003)