Progress on the Movement Toward Risk-Informed Performance Based Standards

American Nuclear Society
Annual Meeting / June 2005
Andrew Persinko
U.S. Nuclear Regulatory Commission

Categorization of Nuclear Facility Structures, Systems, and Components for Seismic Design

ANSI/ANS-2.26-2004

ANS Seismic Standards

- **ANSI/ANS-2.26 – categorizing SSCs based on failure consequence and limit states**
- **ANSI/ANS/SEI 43-05 – specifies seismic design criteria and analysis methods**
- **ANS-2.29 – site specific seismic hazard curve and uniform hazard response spectra**
- **ANS 2.27 – geotechnical investigations**

ANSI/ANS-2.26 Main Points

- **Seismic Design Categories (SDC) based on consequences of failure to public, worker and environment**
  - **SDC-1 (lowest consequences) through SDC-5 (highest consequences)**
- **Structure, System and Component limit states**
  - **Limit State A (large distortion short of collapse) through Limit State D (maintain elastic behavior)**

ANSI/ANS 2.26-Main Points

- Matrix of SDC's and limit states
- Select appropriate SDC
- Select most appropriate limit state within that SDC

ANSI/ANS-2.26 Principles

- Defense-in-depth
- Redundancy
- Common-cause failures
- System interaction
- Robustness

10 CFR 70.61 Performance Requirements

	Highly Unlikely	Unlikely	Not unlikely
High Consequence Publ Dose > 25 rem Worker Dose > 100 rem	Acceptable	Not Acceptable	Not Acceptable
Medium Consequence Publ Dose 5 - 25 rem Worker Dose 25 -100 rem Env releases > 5000 Tbl 2	Acceptable	Acceptable	Not Acceptable
Low Consequence Publ Dose < 5 rem Worker Dose < 25 rem	Acceptable	Acceptable	Acceptable

Benefits of Risk-Informed Standards

- **Acceptable and balanced risk**
  - **Increasingly stringent seismic requirements commensurate with consequence severity**