

Nuclear Regulatory Commission Briefing on New Plants

**Industry Panel
June 25, 2008**



NUCLEAR
ENERGY
INSTITUTE

Industry Panel

- **Jack A. Bailey, Vice President,
Nuclear Generation Development,
Tennessee Valley Authority**
- **John M. Richards, Principal Engineer,
Duke Energy Corporation,
Chairman EPRI Structural Reliability & Integrity
Committee**
- **Anthony R. Pietrangelo, Vice President,
Regulatory Affairs, NEI**

Discussion Topics

- **New Plant Status**
- **Industry Priorities**
- **Seismic Topics**

New Plant Status

- **Constructive interactions continue**
- **Post-licensing implementation guidance being developed**
 - **Construction Inspection Program**
 - **ITAAC closeout**
 - **Problem identification & resolution**
 - **Operator training**
- **Implementation of LWA rule**
- **Improving the environmental review process**

Complete Rulemakings

- **Aircraft Impact Assessments**
 - Methodology submitted for NRC endorsement
- **Security**
 - Request SECY release in Fall 2008 to support interactions on new plant security plans
- **Waste Confidence**
 - DOE-applicant interactions on standard contract

Seismic Topics

- **Seismic events have demonstrated robustness of nuclear plant designs**
- **Insights from ESP projects resulted in a four-year improvement program**
 - **Improved, more realistic methodologies and tools now available for seismic evaluations**

Improved Seismic Methodologies & Tools

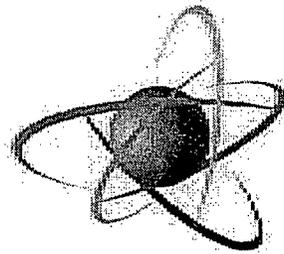
- **Common understanding on improved approaches**
 - **Incoherency methodology**
 - **Cumulative Absolute Velocity**
 - **New software package validation**
- **Process for updating site seismic hazard (PSHA)**
- **Developing thresholds for evaluation of new studies and the significance of differing opinions**

Conclusion

- **New designs increase safety and operational margins**
- **Conclude discussions on implementation of updated & improved methodologies & tools for new plants by end of 2008**
- **Maintain focus on completing new plant related final rules**

List of Acronyms

- **ITAAC – Inspections, Tests, Analyses and Acceptance Criteria**
- **LWA – Limited Work Authorization**
- **DOE – Department of Energy**
- **ESP – Early Site Permit**
- **IPEEE – Individual Plant Examination of External Events**
- **PSHA – Probabilistic Seismic Hazards Analysis**



U.S. NRC

UNITED STATES NUCLEAR REGULATORY COMMISSION

Protecting People and the Environment

PERIODIC BRIEFING ON NEW REACTOR ISSUES

June 25, 2008

Bill Borchardt

Executive Director for Operations

Agenda

- Overview of New Reactor Accomplishments and Status
- New Reactor Seismic Evaluations
- Operator Knowledge and Abilities

Overview of New Reactor Accomplishments and Status

Mike Johnson, Director
Office of New Reactors

Recent Accomplishments and Activities

- Acceptance Reviews and Review Schedules
- Vendor Inspections
- Outreach Efforts

Status of Reviews

- 3 Design Certifications (DCs) and 1 DC amendment under review
 - All acceptance reviews complete
 - All review schedules issued
- 1 Early Site Permit (ESP)/Limited Work Authorization (LWA) application under review
- 9 Combined License applications (COLAs) submitted
 - 8 acceptance reviews complete
 - 5 review schedules issued

Process for Setting Schedules

- Schedules are based on quality and completeness of application
- Integration of resources
- Changes to schedules are handled through a controlled process

Technical Presentations

- New Reactor Seismic Evaluations
- Operator Knowledge and Abilities

New Reactor Seismic Evaluations – Overview and Background

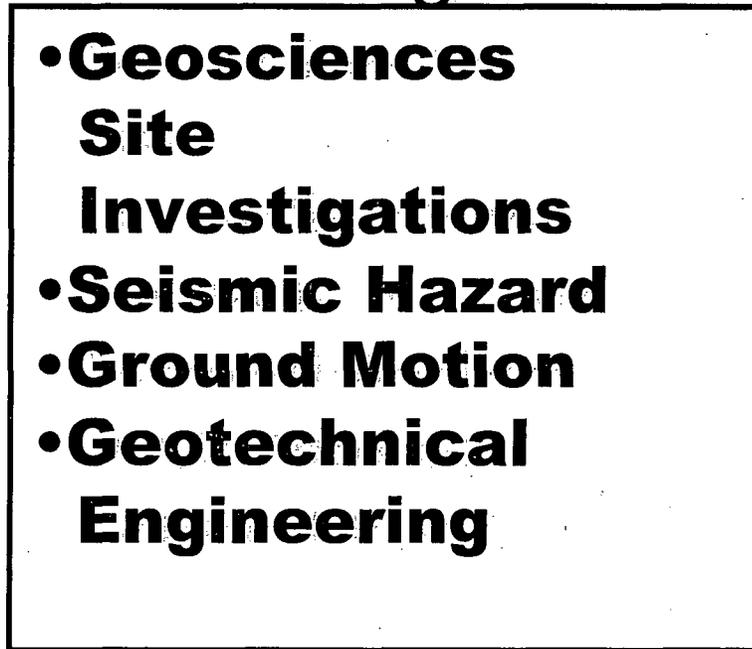
Dr. Nilesh Chokshi, Deputy Director
Division of Site and Environmental Reviews
Office of New Reactors

Purpose

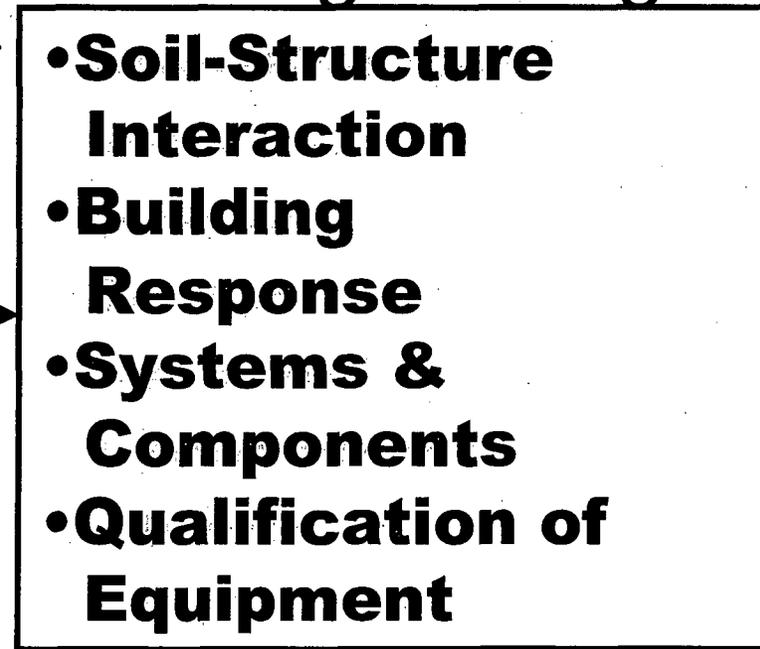
- Provide an overview of NRO seismic review process
- Discuss issues, resolutions, current interactions and future plans

Multidisciplinary Seismic Evaluation

Siting



Engineering



- Staff has broad expertise and capabilities in these areas

Background

- NRC revised Part 100 in mid-1990's
- First implemented in the development of ESP applications
 - Industry initiated a program to address emerging issues
 - Staff formed ad-hoc interoffice expert group
 - Staff approved new methods and developed regulatory guidance

New Reactor Seismic Evaluations – Siting Issues

Becky Karas, Chief

Geoscience and Geotechnical Eng. Branch 1

Division of Site and Environmental Reviews

Office of New Reactors

Siting: Ground Motion Issues

- ESP reviews identified that site-specific ground motion may not be enveloped by certified design response spectra for some sites

Siting: Resolution of Ground Motion Issues

- Industry proposed more realistic models and approaches for:
 - Ground motion determination
 - Engineering analysis
- Extensive stakeholder interactions
- Staff successfully completed 3 ESP reviews
- Issued Regulatory Guide 1.208 with guidance on new models and approaches for ground motion determination

Siting: Soil Dynamic Testing Issue

- Determining soil characteristics under dynamic loading conditions necessary for siting and engineering analysis
- Limited laboratory testing capacity available which could not support full characterization on combined license application schedules

Siting: Resolution of Soil Dynamic Testing Issue

- Industry prepared a white paper supporting limited initial testing
- Staff met with stakeholders and issued Interim Staff Guidance (ISG)
 - Successfully addressed industry schedule needs and staff technical review needs
- Testing capacity increasing for future

Siting: Seismic Source Zone Update Issue

- Guidance for seismic source zone update is provided in Regulatory Guide 1.208
- Differing implementation of updates to seismic source zones by applicants

Siting: Resolution of Seismic Source Zone Update Issue

- Industry addressing detailed process through generic studies and white paper
- Staff reviewing these generic studies to resolve issues on specific applications
- Staff reviewing industry white paper

Siting: Current Interactions and Future Plans

- Staff has completed multiple COLA acceptance reviews
- Need for completeness, technical sufficiency and early communication of new methods emphasized to industry
- Early communication of issues facilitates schedule development

New Reactor Seismic Evaluations – Engineering Issues

Sujit Samaddar, Chief
Structural Engineering Branch
Division of Engineering
Office of New Reactors

Engineering: High Frequency Issue

- Ground motion issues affect design of structures, systems, and components
- One specific issue is the site-specific ground motion response spectra being higher than the certified design response spectra in the high frequency range

Engineering: Resolution of High Frequency Issue

- Interaction between staff and stakeholder
- Framework incorporated in the updated SRP Section 3.7.1, “Seismic Design Parameters”

Engineering: Resolution of High Frequency Issue

- Interim Staff Guidance (ISG) issued May 23, 2007, incorporates implementation details
- Issuance of the ISG provided necessary guidance to applicants for resolving the high frequency issue

Engineering: Current Interactions & Future Plans

- Guidance being used by applicants to address spectral exceedance
- Discussions continue on implementation details of Interim Staff Guidance
- Interim Staff Guidance will be incorporated in the Standard Review Plan or Regulatory Guide as appropriate

Summary: New Reactor Seismic Evaluations

- Issued guidance on site characterization and engineering evaluation methods
- Continuing interactions on implementation of guidance
- Maintaining cognizance of technological advances
- Extensive national and international collaborations

Operator Knowledge and Abilities

Michael Junge, Chief
Operator Licensing & Human Performance
Division of Construction Inspection
& Operational Programs

Highly Integrated Control Rooms

- Enhanced operating environment
- Observations at Mitsubishi Heavy Industries simulator
- Observations at Halden Reactor Project

Developing Knowledge and Abilities Catalogs

- Complete control room design
- Function and task analysis
- Identify required knowledge and abilities
- Catalogs as basis for NRC exams

Incorporation of Digital I&C Knowledge and Abilities Occurs Through:

- Operator training program
- Operator license examinations
- Human factors engineering guidance for highly integrated control room designs

Acronyms

- NRO – Office of New Reactors
- COLA – Combined License Application
- DC – Design Certification
- ESP – Early Site Permit
- LWA – Limited Work Authorization
- ISG – Interim Staff Guidance
- I&C – Instrumentation and Controls