



# 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

- Geosciences Site Investigations
- Seismic Hazard
- Ground Motion
- Geotechnical Engineering



## Engineering

- Soil-Structure Interaction
- Building Response
- Systems & Components
- Qualification of Equipment

- 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