

# Industry Perspective

NRC Public Meeting  
Other External Events Protections

February 22, 2012

# Overview

- Major challenges
- Resources
- Prioritization
- Examples
  - New plant
  - Operating plant
- Anticipated timeline
- Summary

# Major Challenges

- Retaining focus on continued safe operations
- Integration with other Fukushima response activities
- Lack of widespread familiarity and experience with methods
- Finite pool of experts for NRC and industry to utilize
- Potential for differences in results between new evaluations and existing design basis
- Definition of regulatory expectations for resolution
- Expectations for fleet-wide implementation schedule



# Resources Needed

- Site specific hazard screening criteria and process
  - Definition of universe of hazards to be considered
  - Development of industry guidance
  - NRC acceptance of screening approach
  - Piloting

# Resources Needed

- Comprehensive pilot effort
- Subject matter experts
  - Hazard specific spectra
  - Site specific experts
  - PRA modeling support
  - NRC expertise
  - Peer review support
  - Training and mentoring

# Resource Limitations

- Necessity of sequential conduct of activities
  - Piloting of methods and guidance at operating plants
  - Development of industry prioritization process
  - Definition of scope of applicable hazards
  - Reviews and follow-up responses
  - Saturation of analysis infrastructure
  - NRC review resources
- Integration with other Fukushima response activities
- Appreciable expansion of effort scope from new plants to operating plants

# Regulatory Infrastructure Resources

- Stakeholder dialogue
- NRC acceptance of methods
- Development of regulatory guidance for operating plants
- Eventual rulemaking
- Uncertainties with future Congressional direction

## Resources – Present Day Methods

- Current analysis codes and knowledgeable personnel
- Potential standards updates
- Event combinations
- Methodology guidance
  - Realistic methods
  - Updates based on most recent data
- Potential expectations for periodic updates

# Additional Resource Considerations

- Fleet-wide extrapolation of pilot experience for plant-specific hazard evaluation
- Design basis clarity
- Impact on other analyses
- Applicability to spent fuel pools
- Operating modes

# Prioritization – First Steps

- Definition of overall scope
  - Complete evaluation vs. most relevant hazards
  - Design and location specific
- Sequencing
  - Piloting prior to fleet-wide rollout
  - Specific hazard prioritization
  - Plant prioritization
  - Walkdowns
  - Availability of applicable regulatory guidance
  - Review prioritization
  - Expectations from other government agencies
  - Prioritization against other competing needs

# Prioritization - Walkdowns

- Acceptance criteria
- Piloting
- Hazard-specific priorities
- Regulatory interface
- Consideration of impact on personnel and radiation safety
- Coordination with outage schedules and activities

# Prioritization – Screening and Analysis

- Screening
  - Initial screening
  - Follow-on detailed screening
- Analysis
  - IPEEE validation
  - Interface with FLEX
  - Hazard duration

# Example – New Plant

- Design basis evaluation/comparison (overall) – 150 person-hours
  - Site characteristic values based on latest guidance – 500 person-hours
  - Hazard evaluation results/documentation – 120 – person hours
  - Hazard specific resource requirements (average/upper bound)
    - Tornado – 400/800 person-hours
    - Hurricane – 500/3500 person-hours
    - Severe wind – 300/400 person-hours
    - Roof design precipitation – 1000/4000 person-hours
    - Ambient temperature – 1000/2000 person-hours
    - UHS design - 1500/4000 person-hours
    - Other natural hazards (e.g. lighting, sand storms, volcanic) – 300/1000
  - Project management – additional 25% of technical time noted above
  - Licensing – additional 40% of technical time noted above

**Note: Estimates are extreme lower bounds for operating plants**



# Example – New Plant

- Anticipated variances for operating plants
  - More recent site data for new plants
  - New plants designed to more recent standards
  - Fewer vulnerabilities due to new plant designs
  - Design basis established based on newer criteria and data
- Additional activities for operating plants
  - Definition of hazard magnitude given newest data
  - Walkdowns
  - Screening
  - More extensive existing design basis evaluation
    - Documentation reviews
    - Knowledge transfer activities and training

# Example – Operating Plant (Tornado Evaluation)

- Resource constraints
  - Subject matter experts
  - Competition with other analysis needs (e.g. fire, seismic)
  - Methodology development
  - Data updates
  - Availability of regulatory guidance

# Example – Operating Plant (Tornado Evaluation)

- Availability of personnel
  - Expertise limited
  - Plant-specific knowledge needs
  - Design-basis expertise
  - PRA personnel
  - Maintaining focus on continuing safe operation of plant

# Example – Operating Plant (Tornado Evaluation)

- Modeling challenges
  - Treatment of non-safety equipment
  - Switchyard impacts
  - Treatment of beyond design basis hazards
  - Updated data
  - Operating modes
  - Mitigation strategies

# Example – Operating Plant (Tornado Evaluation)

- Time required
  - Clear regulatory framework and direction necessary before analytical work
  - 1500 person-hours for expertise
  - 2000 person-hours for plant specific documentation
  - Additional licensing/LAR follow-on work
  - NRC review

**Note: Resources estimates are only for one hazard and do not include screening needs**



# Proposed Timeline

- Specific dates to be developed later after more evaluation
- Sequence proposal
  - Prioritization process
  - Screening methodology development
    - Regulatory consensus on screening methodology
    - Provisions for initial screening process
  - Walkdowns
    - Development of walkdown criteria
    - Regulatory consensus on walkdown criteria
    - Conduct of screening walkdowns

# Proposed Timeline

- Sequence proposal (continued)
  - Hazard specific evaluations
    - Development of hazard specific methodologies
    - Piloting of specific hazard evaluations
    - Updates to guidance and standards
    - Regulatory evaluation of pilot activities and findings

# Proposed Timeline

- Sequence proposal (continued)
  - Detailed screening
  - Hazard-specific walkdowns
  - Fleet-wide hazard specific evaluations
  - Licensing work
  - NRC review

# Summary

- Consideration as a Tier 2 Fukushima response activity is appropriate given safety significance
- Conduct of this activity will be challenging, even with extended timeline
- Recognition of limited subject matter experts vital to development of appropriate resolution timeframe
- Early NRC engagement with stakeholders beneficial to achieving timely resolution