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U.S. NUCLEAR REGULATORY COMMISSION RESPONSE TO SEISMIC HAZARD AT OPERATING NUCLEAR POWER FACILITIES IN THE UNITED STATES FOLLOWING EVENTS AT FUKUSHIMA DAI-ICHI

Jenise Thompson, Laurel Bauer, Clifford Munson and Gerry Stirewalt

U.S. Nuclear Regulatory Commission

Division of Site Safety and Environmental Analysis

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Introduction

- Background
  - Fukushima Dai-ichi
  - NTTF Recommendations
- 50.54(f) Information Request
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  - Recommendation 2.2
  - Recommendation 2.3
- Geologic Information in R2.1
  - Guidance Documents
  - Reevaluations
  - CEUS-SSC
- Current Status
- Long-Term Actions (R2.2)

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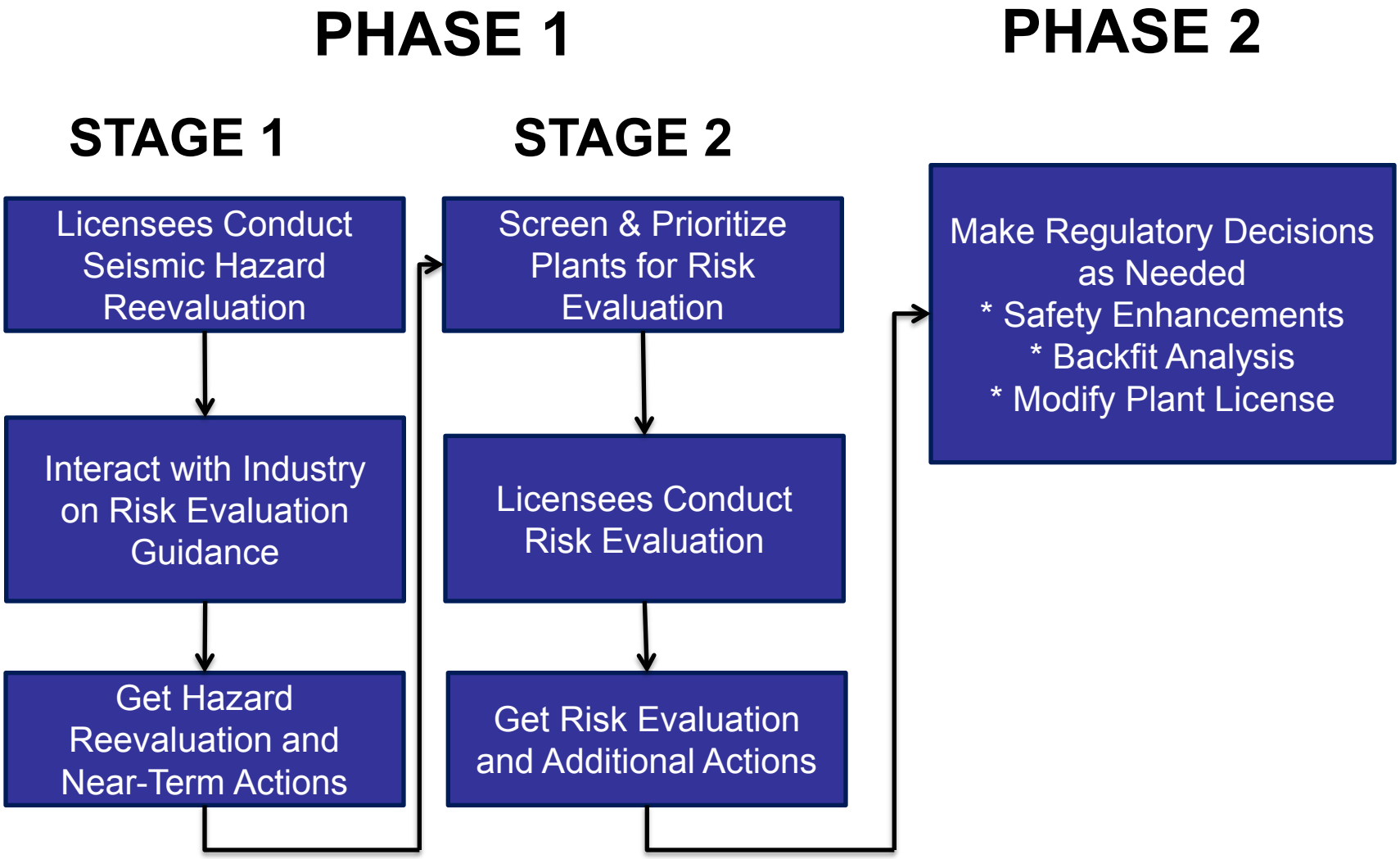
Background

- Earthquake and subsequent tsunami damaged reactors at the Fukushima Dai-ichi in March 2011
- Near-Term Task Force outlined recommendations to improve reactor safety at US plants in July 2011
- Staff and Commission began to develop an approach for implementation of these recommendations in October 2011
- 50.54(f) request for information letter was issued in March 2012

50.54(f) and the Near-Term Task Force Recommendations

- 2.1 – “Order licensees to reevaluate the seismic and flooding hazards at their sites against current NRC requirements and guidance, and if necessary, update the design basis and SSCs important to safety to protect against the updated hazards.”
- 2.2 – “Initiate rulemaking to require licensees to confirm seismic hazards and flooding hazards every 10 years and address any new and significant information. If necessary, update the design basis for SSCs important to safety to protect against the updated hazards.”
- 2.3 – “Order licensees to perform seismic and flood protection walkdowns to identify and address plant-specific vulnerabilities and verify the adequacy of monitoring and maintenance for protection features such as watertight barriers and seals in the interim period until longer term actions are completed to update the design basis for external events.”

R2.1 Overall Implementation Approach



R2.1 Guidance Development

- Screening, Prioritization, and Implementation (SPID) Guide (ML12293A002)
  - Being developed by industry with NRC input
  - Objective is to be endorsed by NRC and published by November 30
- NRC SMA Enhancements ISG (ML12222A327)
  - Developed by NRC staff
  - Draft issued for public comments, final to be issued by end of the month

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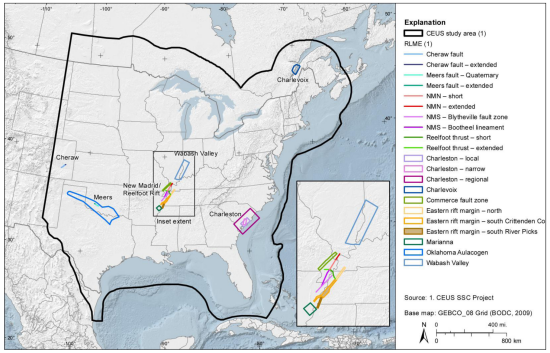
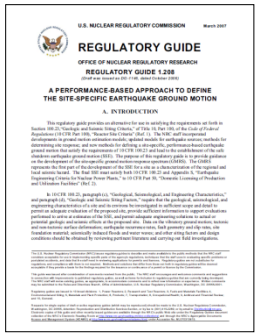
SPID

- Site Response
  - Control point elevation (Section 2.4.2)
  - Sites with limited subsurface data (Section 2.4.1)
  - Ground Motion amplification including soil profiles used (Appendix B)
  - NGA-East Ground Motion Model

R2.1 Seismic Hazard Reevaluation

- PSHA develops plant-specific GMRS (RG1.208)
- CEUS licensees (96 units/59 sites)
  - CEUS SSC Source model (NUREG 2115)
  - EPRI Ground Motion model
  - Plant-specific site response analysis
- WUS licensees (8 units/4 sites)
  - Site-specific SSHAC level 3 studies for sources and ground motion (NUREG 2117)
  - Plant-specific site response analysis




U.S. NUCLEAR REGULATORY COMMISSION March 2007

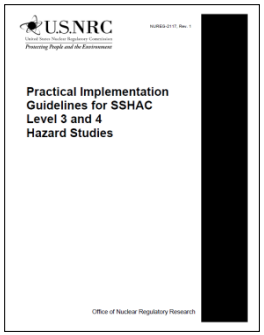
REGULATORY GUIDE

OFFICE OF NUCLEAR REGULATORY RESEARCH

REGULATORY GUIDE 1.208

A PERFORMANCE-BASED APPROACH TO DEFINE THE SITE-SPECIFIC EARTHQUAKE GROUND MOTION

A. INTRODUCTION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Practical Implementation Guidelines for SSHAC Level 3 and 4 Hazard Studies

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Central and Eastern US Seismic Source Characterization (CEUS-SSC)

- Considered new geologic information since licensing
- Not to the same level of detail as a licensing application

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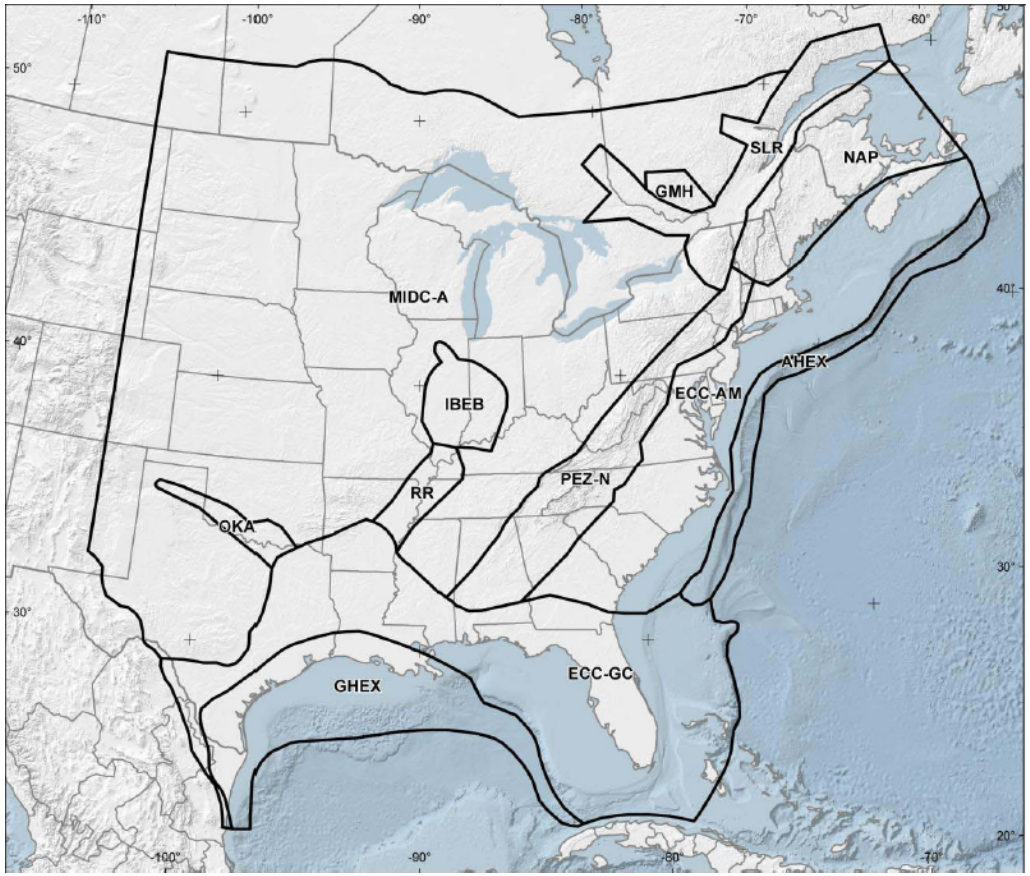
CEUS-SSC Models



Expert in geology, tectonics, and geophysics developed models over a 3 year period

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Seismic Reevaluations

- Seismic Hazard Screening Report (SPID Section 4) will include several paragraphs on tectonic setting and history and prominent geologic features
  - Detailed discussions of new geologic information are not required
- SSHAC Level 3 (WUS)
  - Geologic information may be considered

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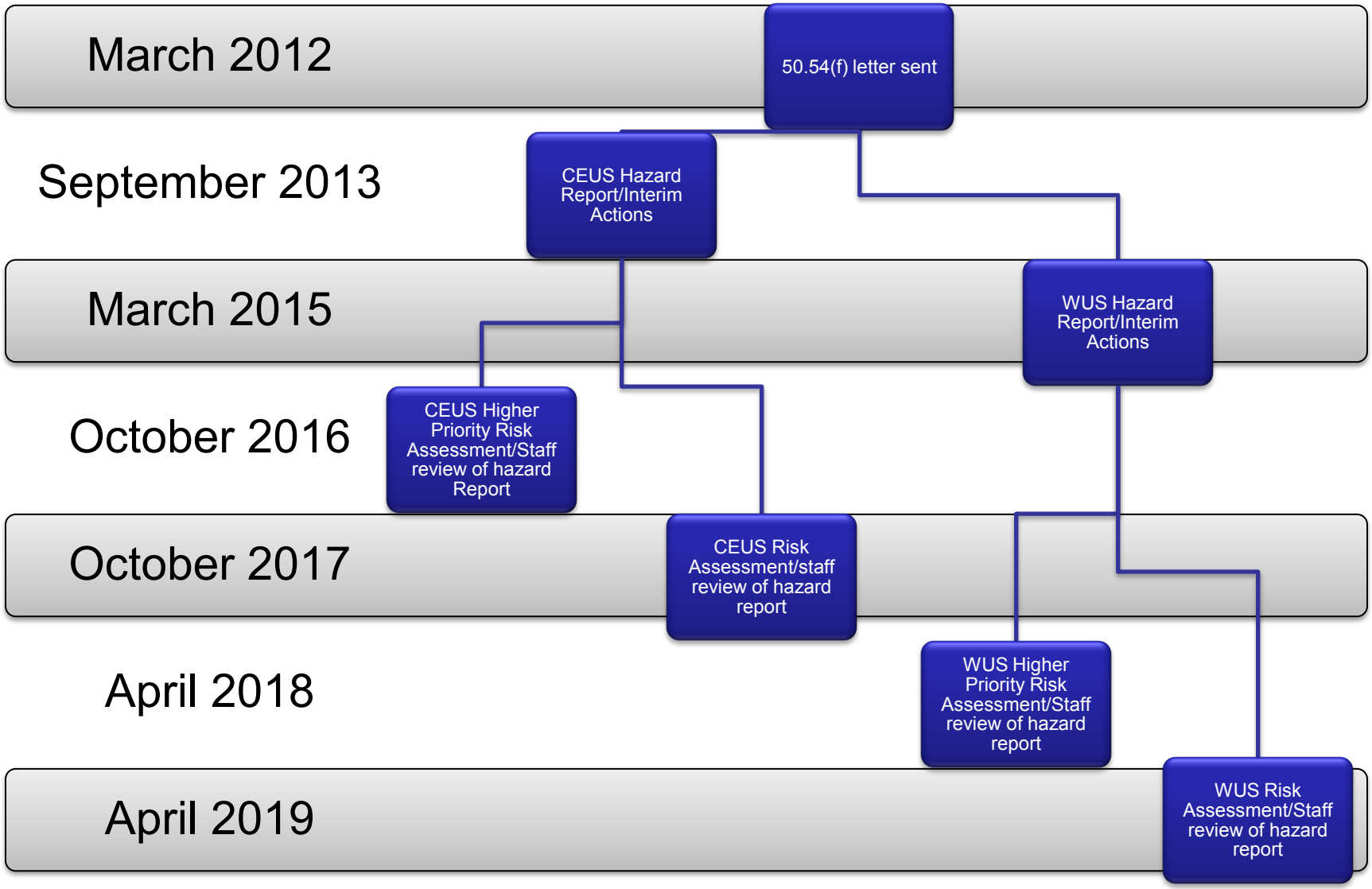
Timeline for Completion



Long-term Actions – R2.2

Pre-rulemaking activities:

- Collect information as it comes up for R2.1 and R2.3
- Engage with external stakeholders as appropriate

Questions to be answered:

- What constitutes new and significant information?
- What will the staff do with the updated hazard information?
  - Use of risk-informed approach?
- How will staff determine if it is necessary to update the design basis for SSCs important to safety?
  - Threshold for regulatory actions
- Review of international practices and insights from R2.1

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Overall Actions

R2.3 - Walkdowns

R2.1 Hazard Reevaluations and Interim Actions

R2.1 Risk Assessment (if required)

Regulatory Actions (if appropriate)

R2.2 – Periodic Reevaluations of new and significant information