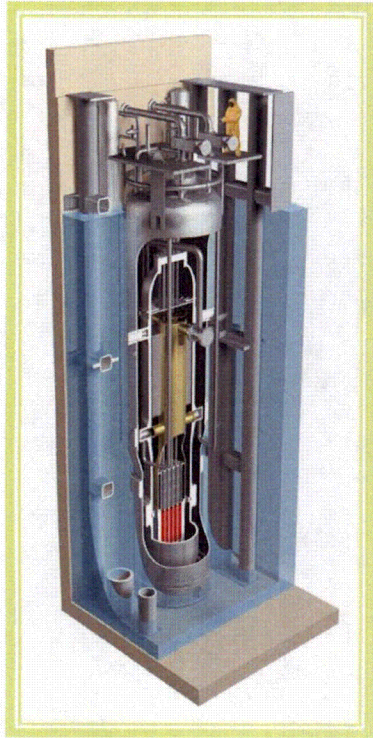


Enclosure 1:

"Seismic Methodology – Class I Structures," PM-0515-14084-NP, Rev. 0 nonproprietary version

Seismic Methodology— Class I Structures



Josh Parker, PE,
Lead Civil/Structural Engineer
Dr. Tamás Liskai, PE,
Reactor Module Design Supervisor

July 9, 2015

Acknowledgement & Disclaimer

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Agenda

- Purpose of this meeting
 - Background
 - DCD Section 3.7
 - two seismic Category I structures—reactor building (RXB) and control building (CRB)
 - design parameters (3.7.1)
 - seismic analysis (3.7.2)
 - subsystem analysis and seismic monitoring system (3.7.3 and 3.7.4)
 - DCD Section 3.8 update
 - containment (3.8.1, 3.8.2 and 3.8.3)
 - Category I structures and foundations (3.8.4 and 3.8.5)
 - Appendix 3A—reactor module (which includes containment) is not a structure
 - Other chapters and sections
 - Conclusion
-

Purpose of this Meeting

- Inform the NRC about the NuScale seismic analysis scope of work and receive feedback
- Provide NRC with early discussion of information that will be included in DCD Sections 3.7.1 and 3.7.2
- Provide NRC with update of status of DCD Chapter 2.0 and Sections 3.2, 3.3, 3.4, 3.5, and 3.8
- Update NRC on current results of seismic analysis of reactor modules

Background—Design Team

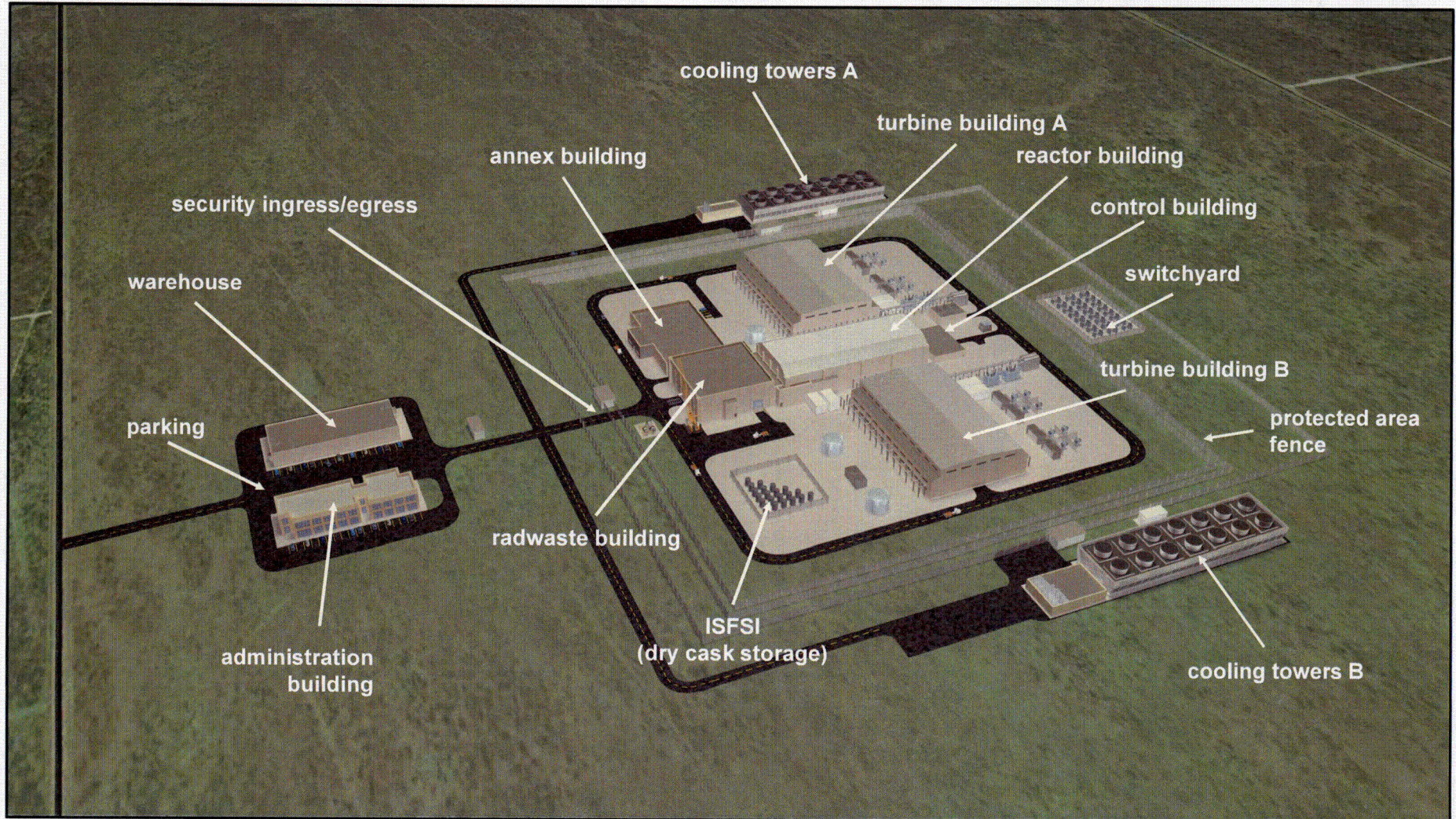
NuScale Power Structural Team

- Susan Farnworth, PE, SE – seismic and structures manager
- Dr. Tamás Liskai, PE – supervisor, reactor module design
- Josh Parker, PE – reactor building lead
- Roy Williams – radioactive waste building lead
- Craig Harwood, PE, SE – control building lead
- Dr. Mohsin Khan ARES Corporation – seismic building analysis

NuScale Power Seismic Expert Panel

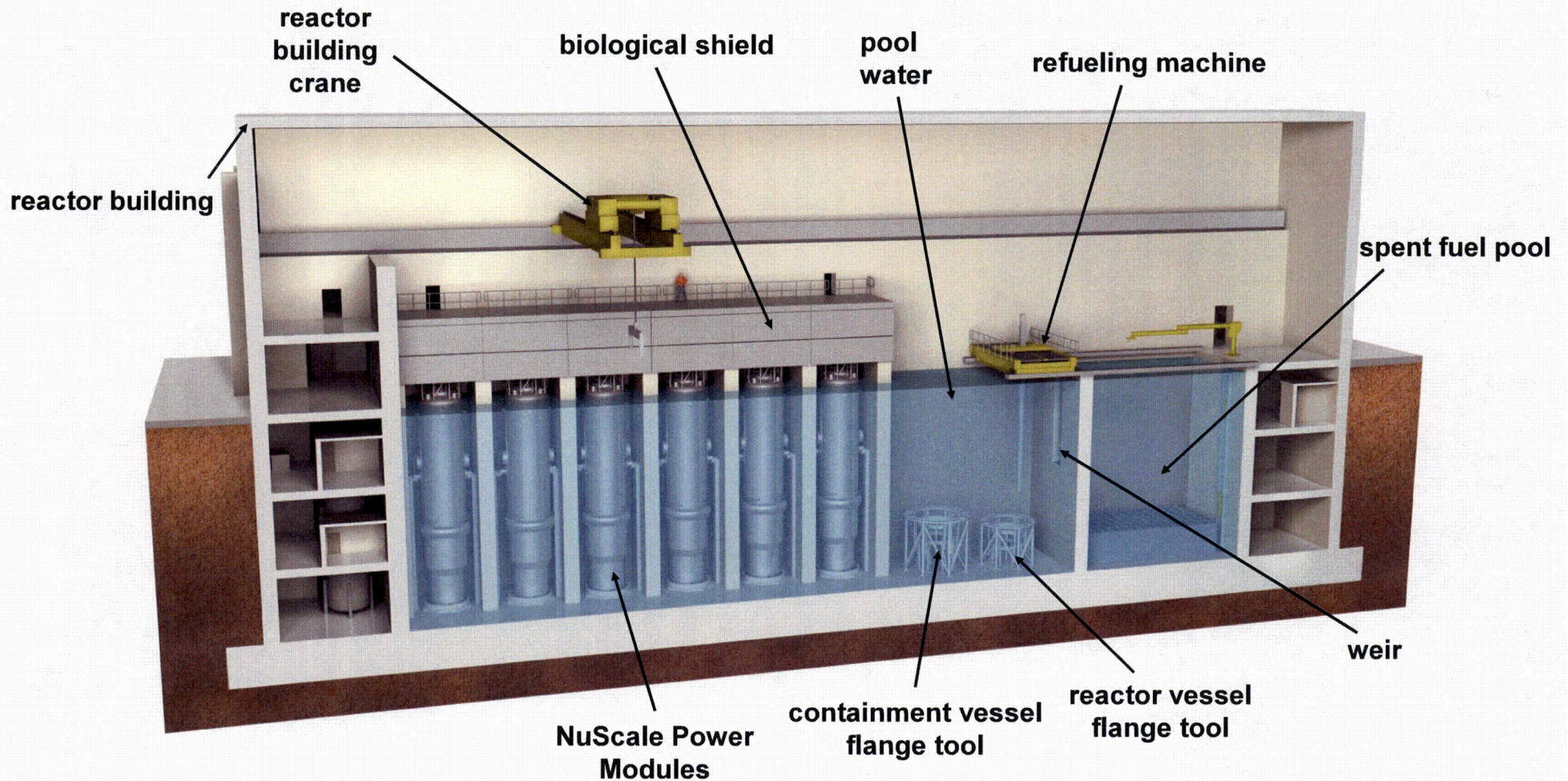
- Robert Bachman, PE, SE
- Dr. Robert Kennedy, PE
- Greg Hardy, PE (component experience, Simpson Gumpertz Heger)
- Dr. Andrew Whittaker (MCEER, University of Buffalo)
- Bill Schmidt, consultant

Background—Site Aerial View

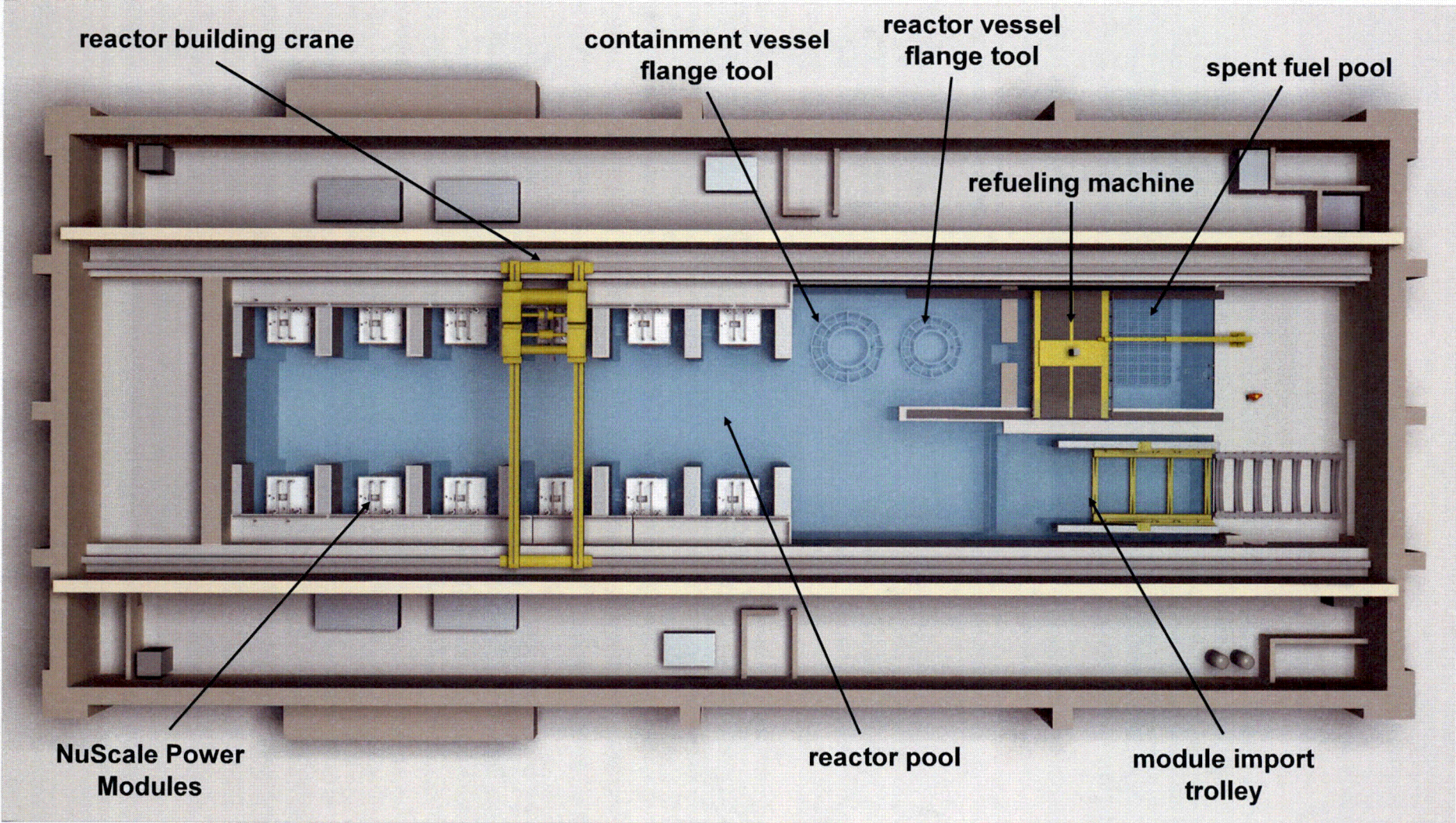


Background—RXB Cross-Section

Reactor building houses reactor modules, spent fuel pool, and reactor pool

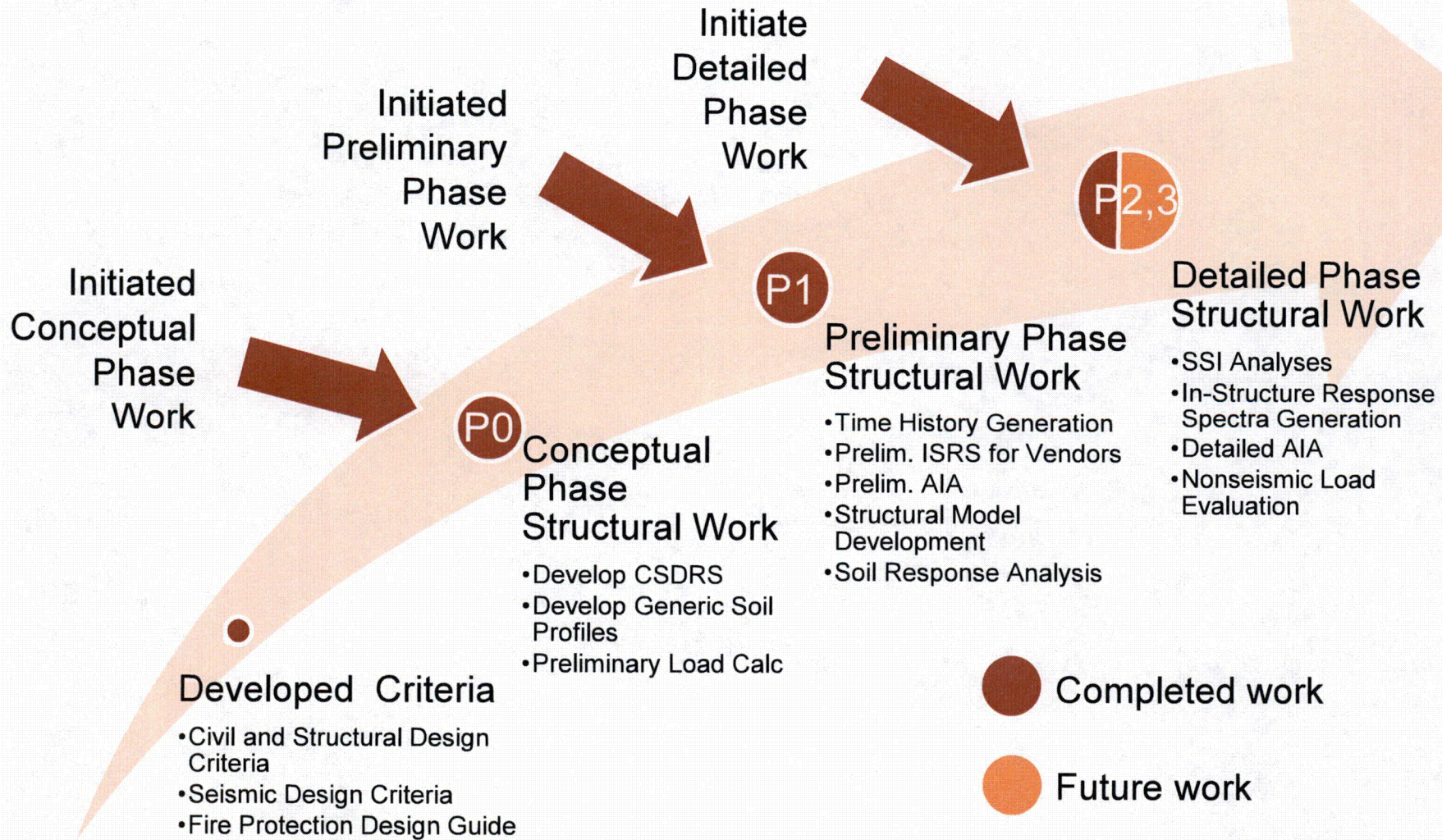


Background—RXB Overhead View



Background

Structural Design Process and Status



NuScale Seismic Design Approach

- **Seismic design parameters**
 - response spectra
 - time histories
 - soil profiles
- **Seismic analysis**
 - reactor building
 - in-structure response spectra and time histories
- **Subsystem analysis, seismic monitoring system, and design of Category I structures**
- **Reactor module seismic analysis**
- **Other chapters and sections**
- **Summary**

Response Spectra

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Response Spectra

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Response Spectra

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NuScale Seismic Design Approach

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Time Histories

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Time Histories

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Time Histories

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Time Histories

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Time Histories

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NuScale Seismic Design Approach

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Generic Soil Profiles Overview

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Generic Soil Profiles Overview

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Generic Soil Profiles Overview

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Generic Soil Profiles Overview

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NuScale Seismic Design Approach

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Reactor Building Model Overview

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Reactor Building Model Overview

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Reactor Building Model Overview

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Reactor Building Model Overview

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Reactor Building Model Overview

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Reactor Building Model Overview

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Reactor Building Model Overview

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NuScale Seismic Design Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Approach

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In-Structure Response Results

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In-Structure Response Results

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In-Structure Response Results

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In-Structure Response Results

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In-Structure Response Results

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In-Structure Response Results

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In-Structure Time History Approach

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NuScale Seismic Design Approach

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Subsystem Analysis

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Seismic Monitoring

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Design of Category I Structures

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NuScale Seismic Design Approach

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NuScale Power Module

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RXM Seismic Support Configuration

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Reactor Pressure Vessel Supports

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RXM Three Dimensional (3D) Model

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RXM 3D Model

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RXM 3D Model

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RXM Beam Model

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RXM Models Benchmark/Tuning

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RXM Vertical Response

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RXM Vertical Model

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Typical Vertical Model Results

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Details of Results

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RXM Seismic Methodology

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Other Chapters and Sections

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Other Chapters and Sections

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Other Chapters and Sections

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Other Chapters and Sections

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Other Chapters and Sections

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Summary

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Summary

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Summary

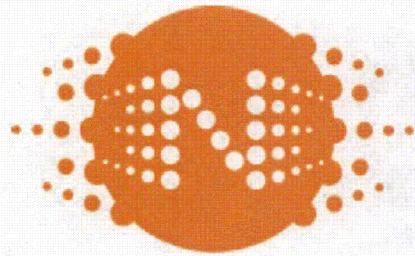
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Conclusion

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