

# Design and Construction Considerations in Conceptual Design of Advanced Reactors

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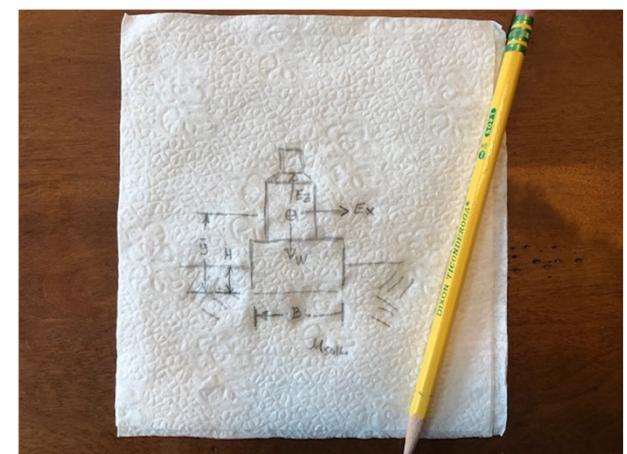
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## Background

- The world-wide demand for advanced nuclear reactor technology is steadily increasing
- A key factor to advanced reactors success will be in reducing construction costs and schedule
- Reactor vendors make early decisions of commercial viability based on conceptual design assumptions
- These early decisions commonly ‘set’ building layout and design moving forward
- Informed conceptual design decisions are important for ensuring success of advanced reactor projects

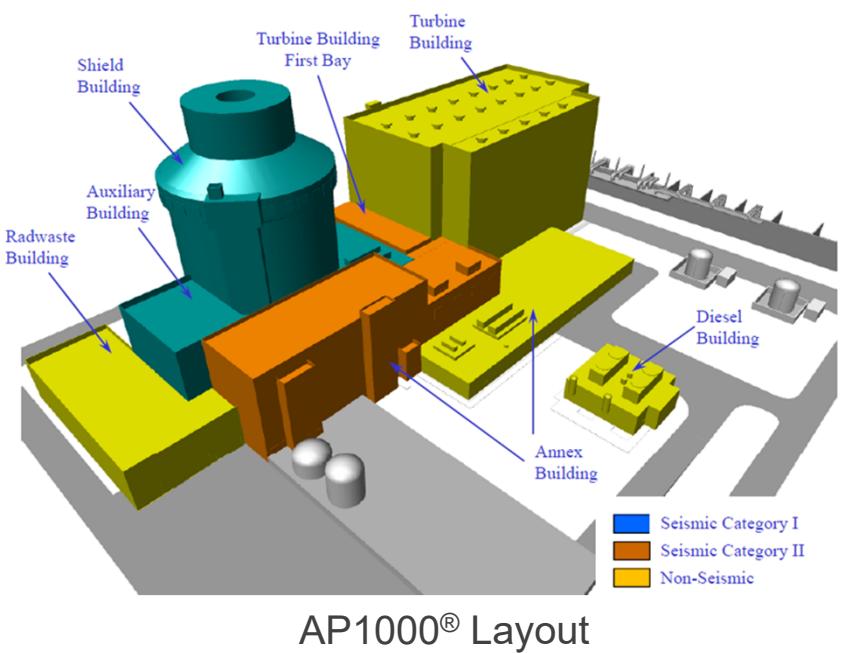
## Conceptual Design Process (Civil/Structural Perspective)

- Process is typically brief and informs cost and schedule projections
- Significant unknowns (site properties, construction methods, design codes and standards)
- Conceptual Design Process:
  - Interfaces with systems and components groups
  - Layout process is iterative
  - Safety classification assumptions
  - Constructability and licensing considerations
  - Cost considerations (need for improved tools)
- Refinements on basic layout



## Civil/Structural Decisions

- Embedment and method of excavation (seismic analysis considerations)
- Accessibility
  - Compact design may have inefficiencies
  - Access for efficient movement of craft and materials
- Base Isolation and Equipment Skids
- Aircraft Impact Considerations
  - Can significantly affect layout
  - Relaxed requirements for compact designs?
- Seismic Interactions
  - NEI LMP (risk-informed design)
  - Building Collapse Evaluation (limited guidance)



## Civil/Structural Decisions (Cont'd)

- Modular Construction
  - System decision (SC, Pre-cast concrete, etc.)
  - Basemat anchorage
  - Exterior foundation walls (exposure to soil/moisture)
  - Floors/roofs
  - Transportation limitations
  - On-site fabrication/assembly requirements
  - Fit-up and tolerances
- Field Routing (minimize)
- Trades/Craft (training)
  - Qualify through practicum testing (anchorage/connections/etc.)



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## Summary

- Informed conceptual design decisions are key factors in successful advanced reactor projects
- Constructability, modularization, accessibility, and improved cost tools are key factors to reducing construction costs and schedule
- These early decisions commonly ‘set’ the design moving forward
- Improved construction cost estimating tools will help significantly

# Thank You

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