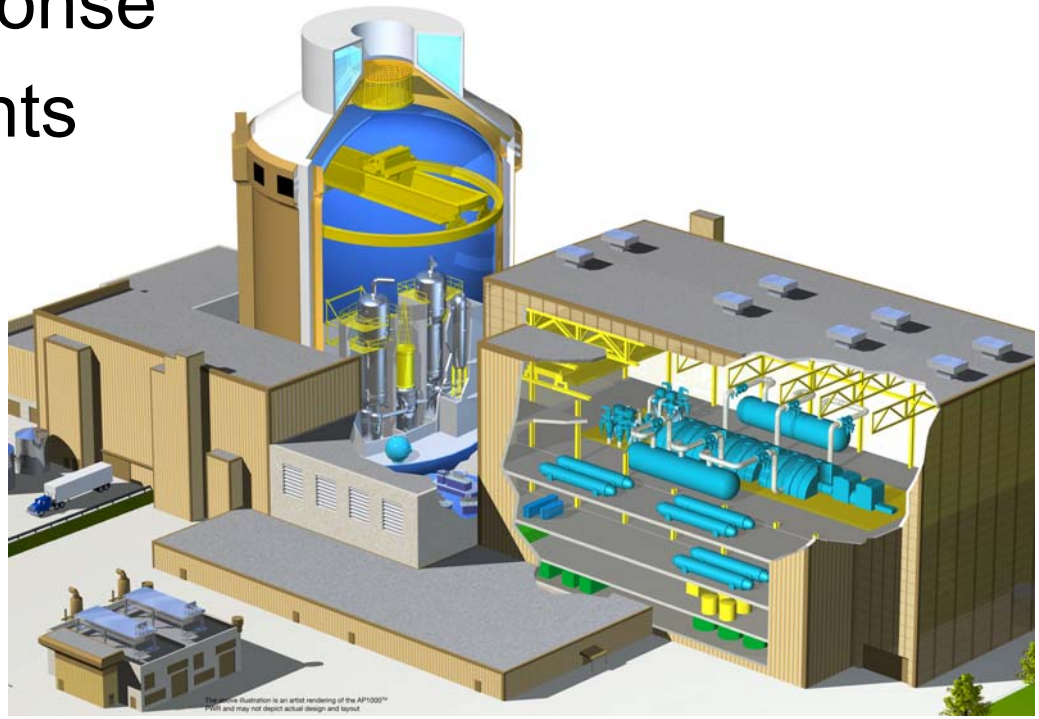
AP1000™ Shield Building

Bruce Bevilacqua
Vice President, Engineering
Westinghouse Nuclear Power Plants

Topics of Discussion

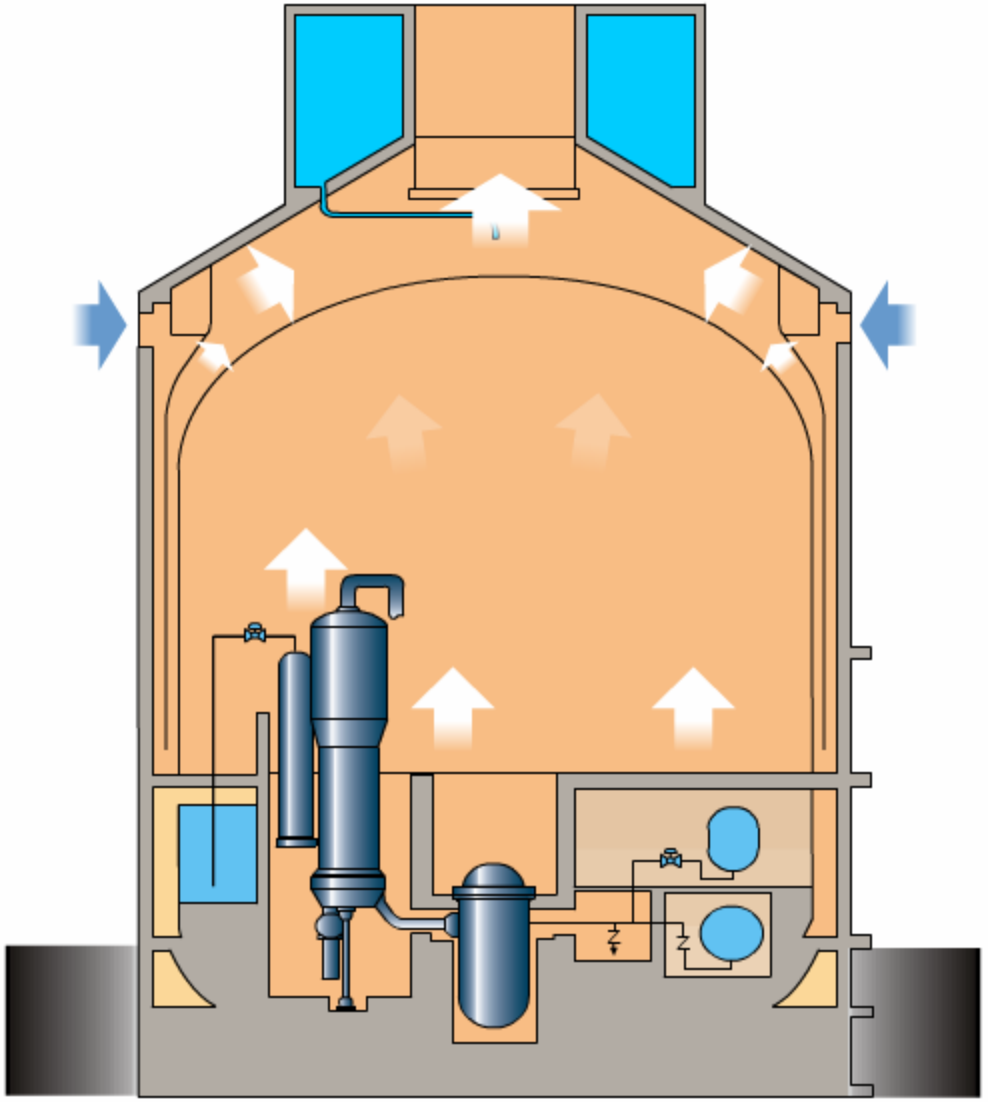
- Shield Building Function
- Westinghouse Response
- Design Enhancements



Function of Shield Building

- Integrated structure in the AP1000 design
- Provides passive cooling of the containment and radiation shielding
- Designed to shield containment from environment
  - Protect against tornadoes, seismic events

Passive Containment Cooling



Shield Building Evolution

- The initial shield building consisted of a reinforced concrete design, which was certified in December 2005
- In response to world events, the NRC challenged new plant design organizations to meet enhanced aircraft impact design standards
- Westinghouse chose a combination of steel concrete composite (SC) and reinforced concrete (RC) construction techniques to meet this challenge

Benefits of Steel Composite Construction

- Improves aircraft impact resistance
- Suitable for modular construction
- Common design technique used in other countries, in particular the Japanese Nuclear Industry

Image courtesy of Tokyo Electric Power Company (TEPCO)

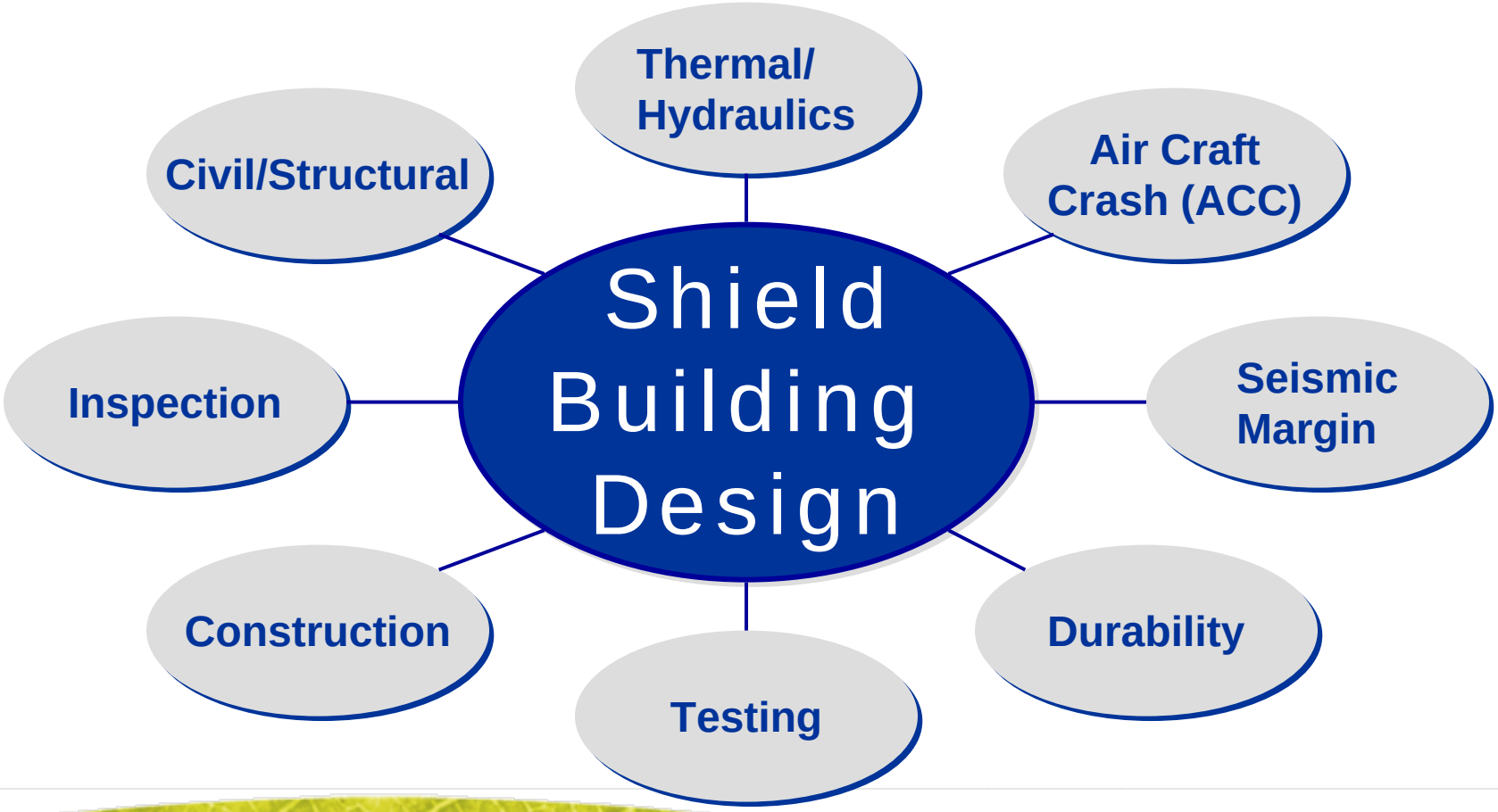
Major Points from NRC Assessment of AP1000 SC Design

- Design of the SC structure must demonstrate the ability to function as a unit during Design Basis Event (DBE)
- The design of the SC/RC connection must function following a DBE
- Design of the tension girder (air-inlets) must be supported by a confirmation test or a validated benchmarked analysis method

Westinghouse Response

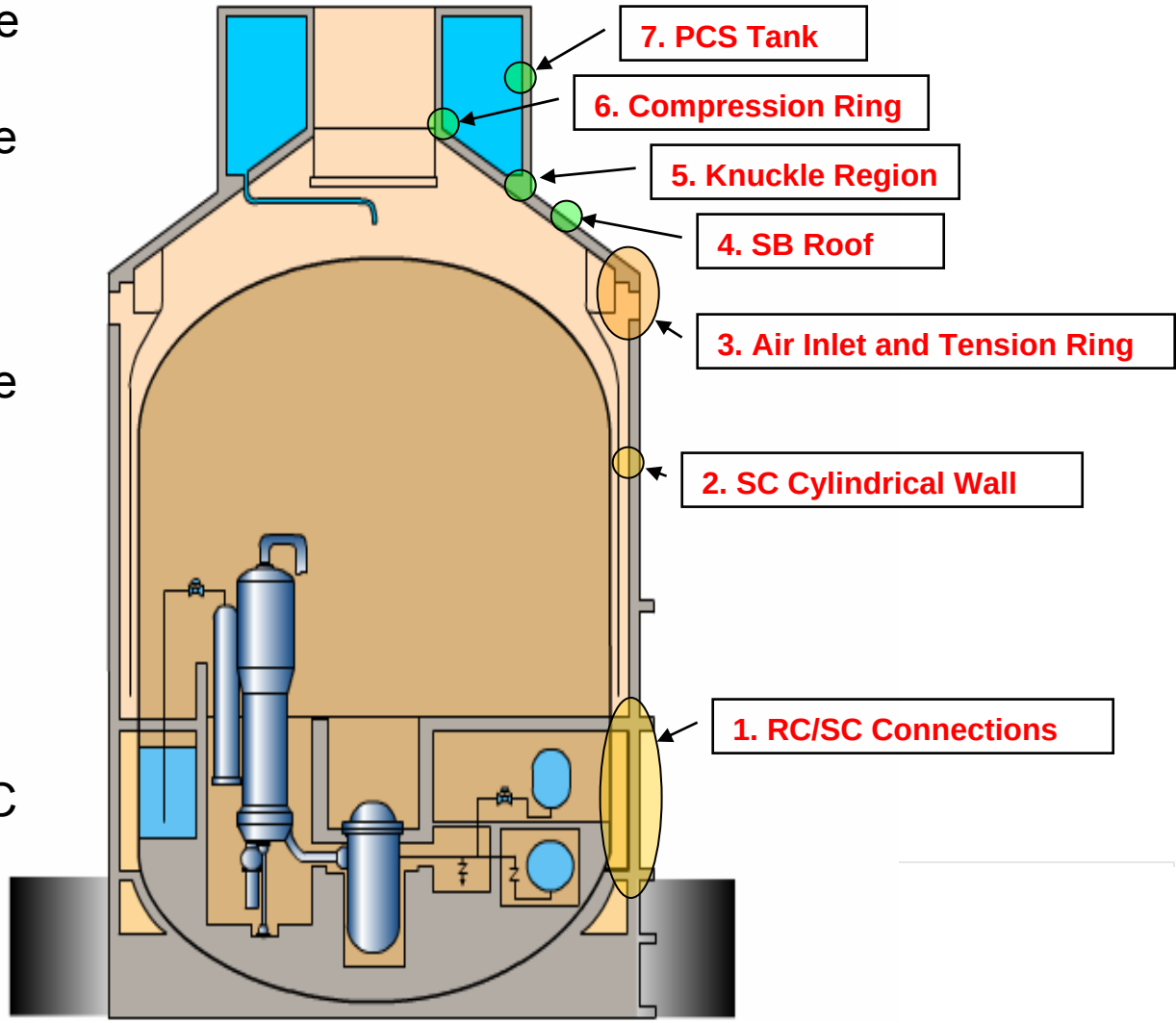
- Modifying shield building design to address NRC assessment
- Enhanced our design team with additional outside industry experts. Team includes;
  - Shaw, Purdue University, URS, Obayashi, Ansaldo
- Details of design modifications to be addressed in proprietary session with NRC
- Expect to resolve all technical comments

Integrated Design Process



Shield Building Design Changes

- Added Shear Reinforcing Tie Bars that tie the entire SC structure together so that the shield building acts as a single unit
- Increased SC plate thickness changed to a more ductile material to improve its strength, ductility and resistance to buckling
- Simplified air-inlet design to increase its structural integrity and to improve the SC-RC connection to the RC roof design
- Reduce the use of Self-Consolidating Concrete



Westinghouse Response

- The AP1000 shield building design is being modified to improve its performance during Design Basis Events
- Westinghouse is conducting testing that demonstrates the AP1000 shield building is a safe design
- Westinghouse has simplified the tension-ring and air-inlet portion of the shield building and will provide benchmarked analyses that show large margin to design limits

Summary

- Westinghouse is addressing NRC review comments to the shield building design
- Enhancements to the shield building will be addressed in a revised integrated AP1000 shield building report that will be submitted to the NRC in January 2010
- Westinghouse will demonstrate that the AP1000 shield building design is safe, robust and meets regulatory requirements

More information about the AP1000 and a copy of this presentation can be found at **http://ap1000.westinghousenuclear.com/ap1000_nui_reg.html**