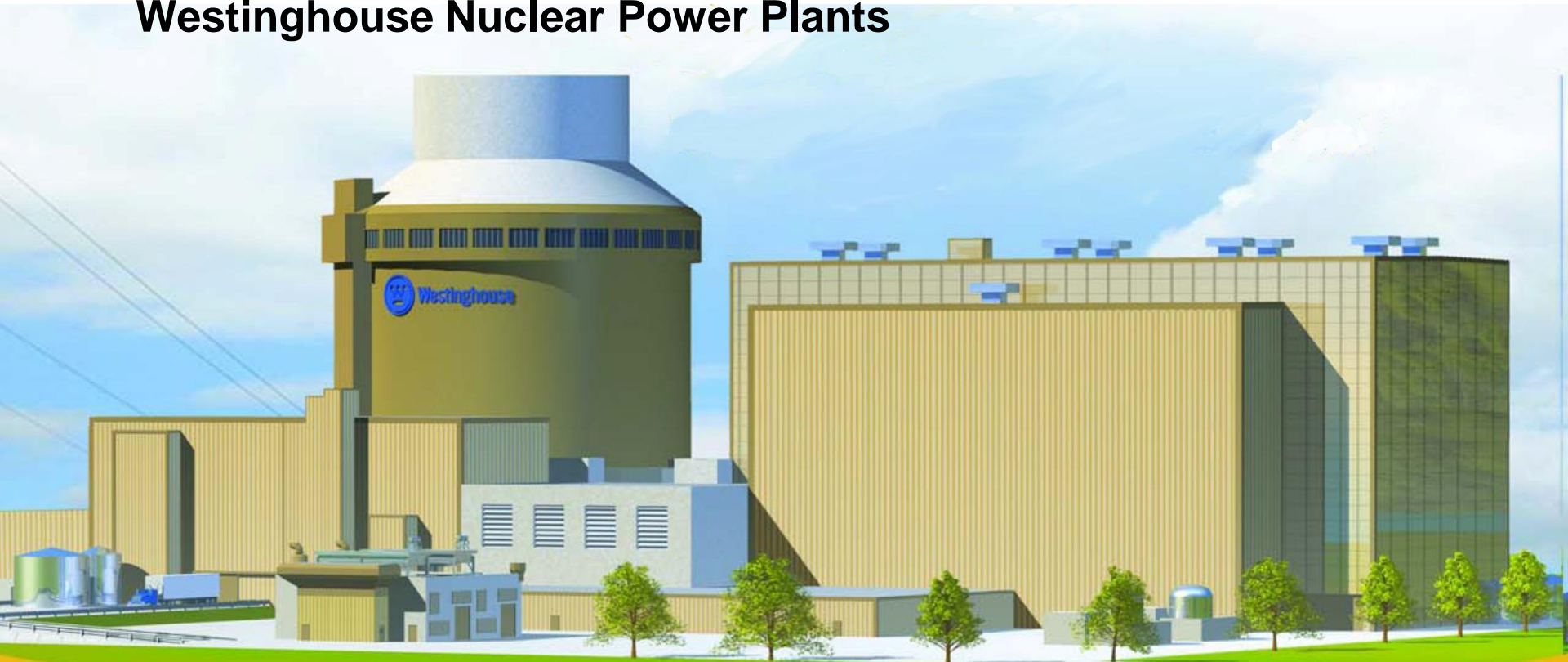


AP1000™ Shield Building Structural Review Update

NRC PUBLIC SESSION

June 9, 2010

Bruce Bevilacqua
Vice President, Engineering
Westinghouse Nuclear Power Plants

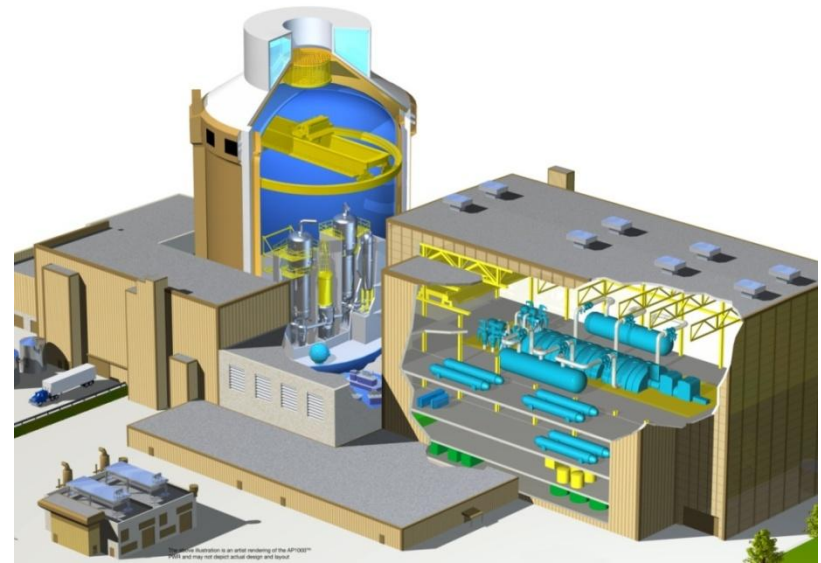


Resolution Plan for Shield Building

- Recent History of AP1000 Shield Building
 - Summary of NRC letter
- Actions Taken to Address Review Issues
 - Westinghouse Integrated Approach
 - Design Changes
 - Testing and Analysis

AP1000 Shield Building Functions

- Shields the containment vessel and systems within the containment from external events during normal operations, such as tornados and tornado-driven objects
- Supports the passive containment cooling water storage tank (PCCWST)
- Provides for natural air circulation cooling of the containment vessel
- Provides an additional radiological barrier for radioactive systems and components inside the containment vessel



Shield Building Evolution

- The AP1000 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)

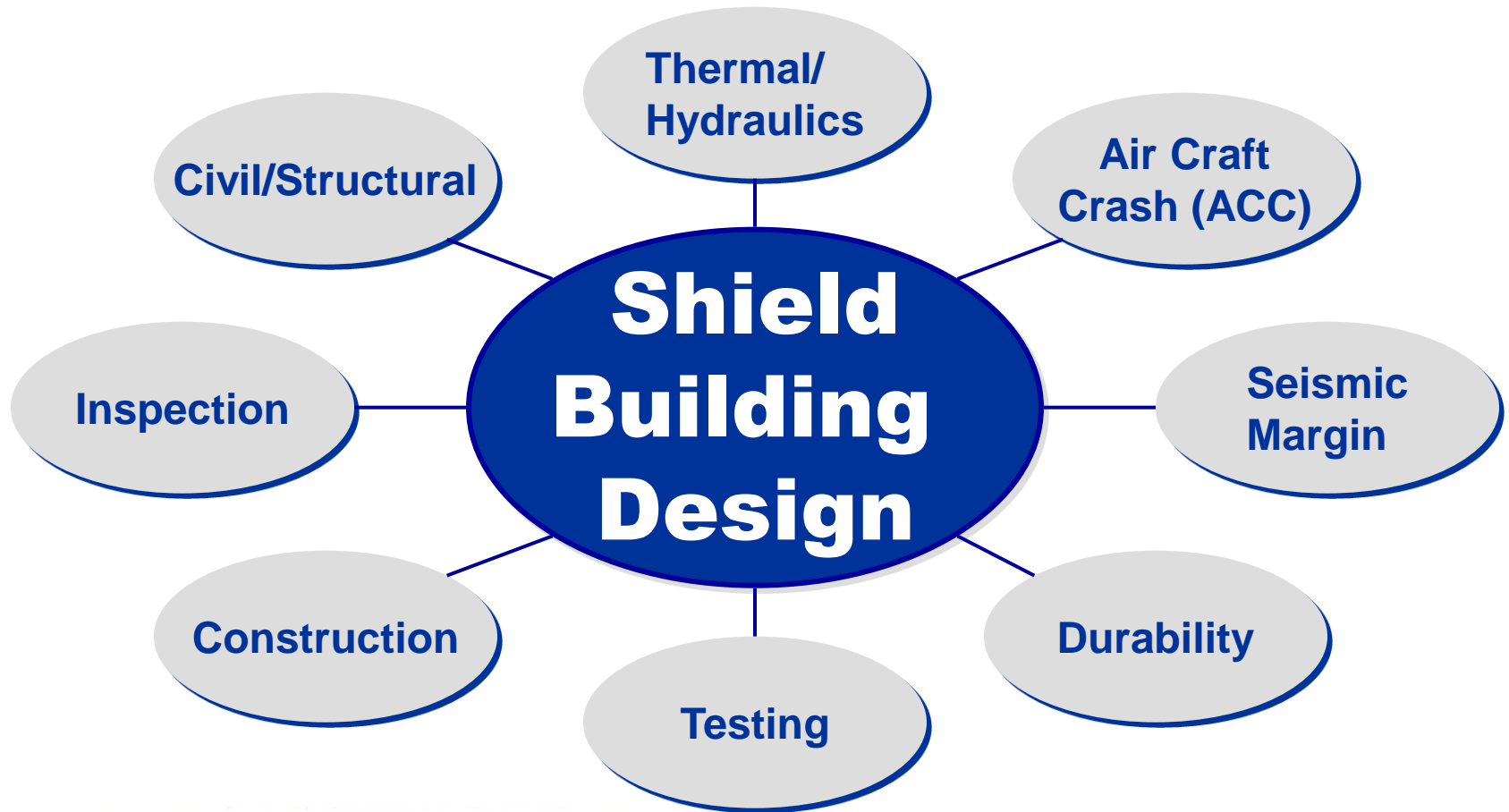
Summary of NRC Letter

- On October 15, 2009 the NRC issued Westinghouse a letter on the Shield Building 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

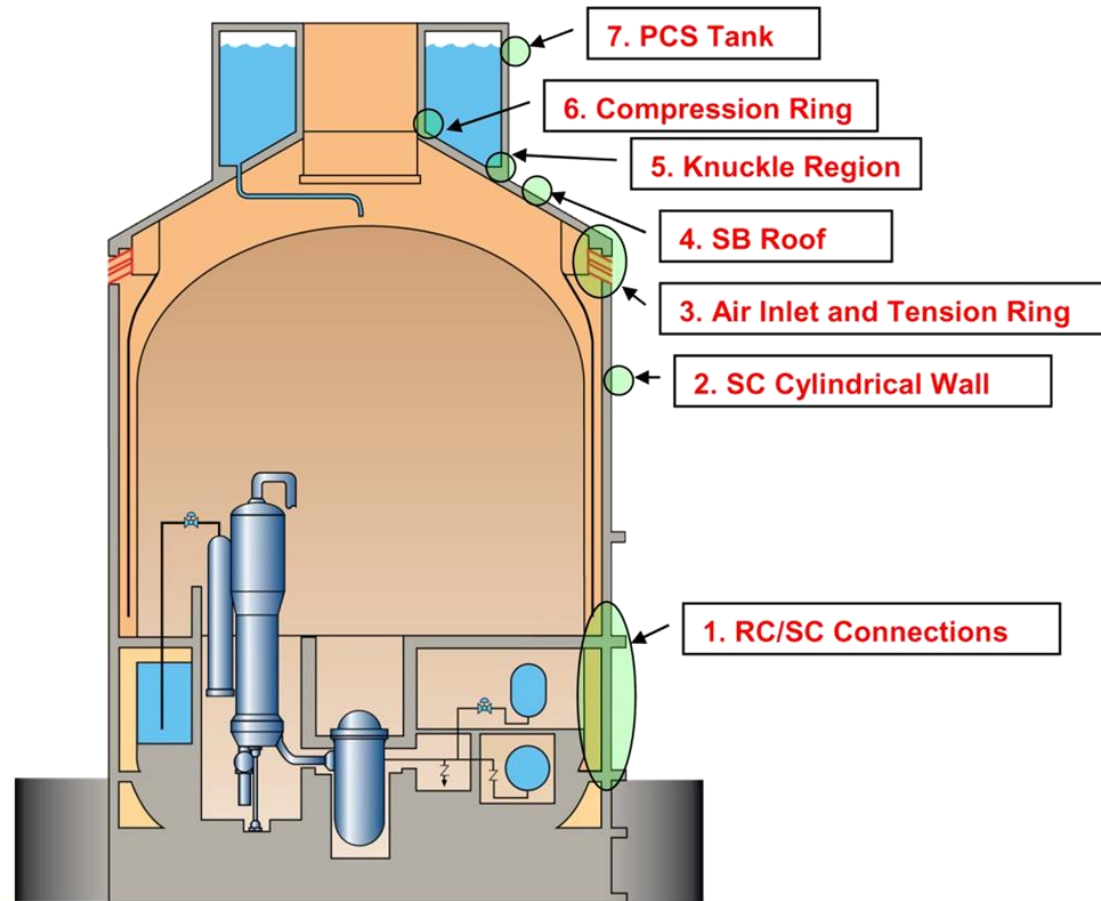
- Redesigned the Shield Building to include design features that enable the structure to act as a unit following DBE
- Enhanced our design team with additional outside industry experts including Shaw, Toshiba, Purdue University, URS, Obayashi, Ansaldo Nucleare, Twining Labs and Rutgers University Research
- A Comprehensive Design Report has been submitted to the NRC that describes design, testing and analysis results that demonstrate the safety of the AP1000 Shield Building

Integrated Design Process



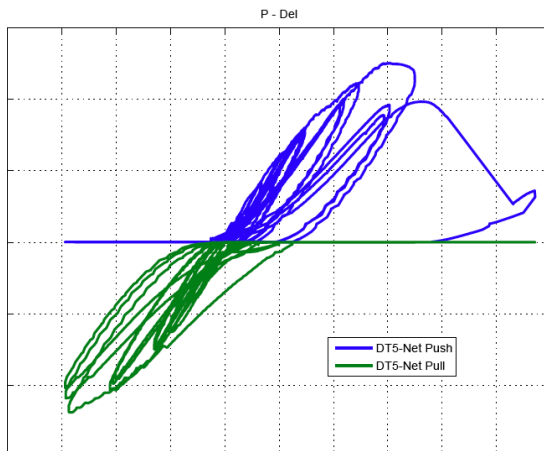
Shield Building Design Changes

- 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 and changed to a more ductile material to improve its strength, ductility and resistance to buckling
- Simplified air-inlet design to increase its structural integrity
- Redesigned SC-RC connections to improve strength and ductility



Comprehensive Testing

- Westinghouse has completed a comprehensive test program at Purdue University
 - Out-of-Plane Shear
 - In-plane Shear
 - Cyclic Behavior
- Purdue testing augments extensive international tests



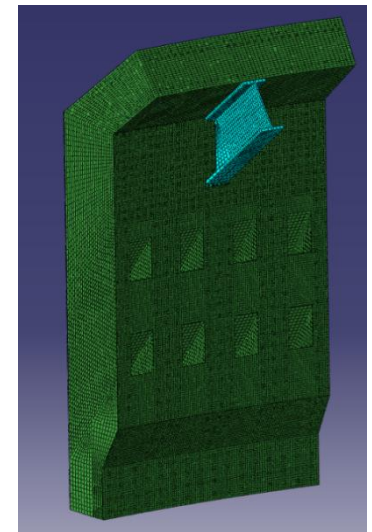
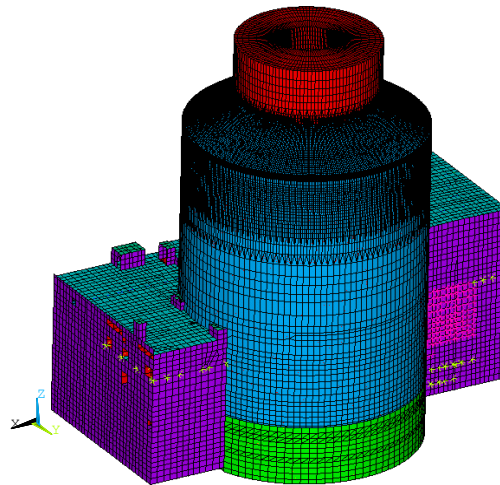
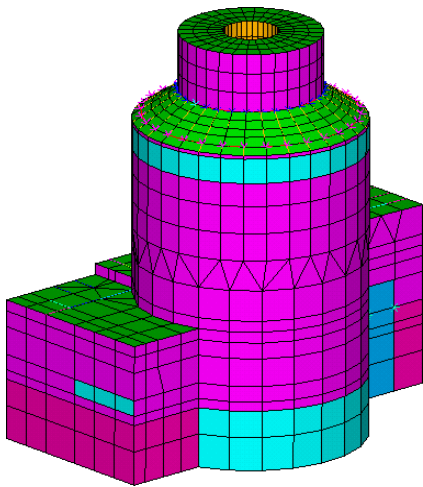
- Test results confirm behavior of SC structures
- Testing provides data to benchmark analysis

Comprehensive Analysis

Level 1:
Development of Building
Load Magnitudes

Level 2:
Determination of Building
Force Distribution

Level 3:
Assessment of Building
Design Margins



Demonstrates that the Shield Building performs its intended safety function under design-basis loads

Shield Building Progress & Schedule

- NRC AP1000 SB Report October 15, 2009
- 1st NRC Meeting – Integrated Design November 18, 2009
- 2nd NRC Meeting – Test & Analysis Plan December 21&22,2009
- 3rd NRC Meeting – Structural Analysis Review January 28&29, 2010
- 4th NRC Meeting- Construction & Inspection February 23, 2010
- Submission of SB Design Report Rev.. 1 March 21, 2010
- Submission of Seismic Report (TR-03) March 21, 2010
- Submission of SB Design Report Rev. 2 May 7, 2010
- Submission HRHF Report (TR-115) May 21, 2010
- Completion of Final Test May 26, 2010
- Final Test Report for In-Plane Shear Cyclic Test June 21, 2010

Summary

- Westinghouse has addressed the NRC review comments from the October 15 letter about the Shield Building design in an integrated and complete fashion
- Shield Building design changes to enhance the safety of the structure have been adopted and are described in the AP1000 Shield Building Design Report
- Testing and Analyses have been completed that demonstrate that the AP1000 shield building design is safe and robust with ample safety margin to meet NRC General Design Criteria 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

