ENCLOSURE 3

Public Meeting with the NRC – AP1000 Enhanced Shield Building Mockup Program
Update – July 10, 2014 (Non-Proprietary)

Public Meeting with the NRC
AP1000 Enhanced Shield Building Mockup Program Update

10 July 2014

Agenda

- Inspection Discussion in Shield Building Design Report
- NDE Results on Vogtle Shield Building Mockups
- Shield Building Mockups in the Licensing Basis
- UFSAR Commitments/ Construction Means and Methods

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Inspection discussion in Shield Building Design Report

John Iacovino – Westinghouse

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Shield Building Design Report

- An NDE-based inspection would be used in the mockup program to determine whether NDE could assess the structural condition of the Shield Building after concrete placement
- Three critical areas identified in the report:
  - Horizontal RC-to-SC connection
  - Vertical RC-to-SC connection
  - Tension Ring/Air Inlet Region
- Engineering acceptance criteria were proposed for the critical defect

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Impact Echo Method

- Impact-Echo method was identified as the best available NDE technology
- Selected for use in the Shield Building mockup program
- Selection was based on testing at Purdue University
- Test specimen at Purdue University was relatively simple in construction
- Impact-Echo had some success at Purdue University in detecting voids and fractures

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Impact Echo Method

- Following Design Certification of the Shield Building, further Impact Echo testing was performed at Westinghouse Waltz Mill Facility
- Test specimen was more representative of Shield Building design than specimen used at Purdue
- Waltz Mill testing was unable to identify voids and defects

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NDE results on Vogtle Shield Building Mockups

Ufuk Dilek – CB&I

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NDE Inspection on Vogtle Mockups

- The intent of Impact-Echo testing during the mockup program is to verify the method can accurately locate critical defects (i.e. voids and delaminations)
  - Under field conditions consistent with construction
  - On modules with dimensions and embedded structures representative of actual construction
  - By personnel with no prior knowledge of void and defect locations
- Inspection performed by Mistras Services Group
- Test equipment and software sourced from Impact-Echo Instruments, developers of the Impact-Echo methodology

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NDE Inspection on Vogtle Mockups

- Mockup was representative of the Shield Building structure
- Simulated concrete voids and defects were placed in the mockup before concrete placement
- Impact Echo NDE was performed on a grid pattern
  - With the detectors scanning through the metal faceplate
  - With the metal faceplate removed and detector placed directly on the concrete

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NDE Inspection on Vogtle Mockups

- Failed to conclusively identify locations of voids and defects
- No apparent improvement when faceplate material was removed and transducers placed directly on concrete
- The examinations did not accurately demonstrate a repeatable ability to identify defects
- The Purdue/Waltz Mill/Vogtle Mockup testing demonstrates the challenges of transitioning from simplified laboratory specimens to field inspection of full-scale mockups

Impact-Echo technology has not matured to a point where voids and defects can be effectively identified in a steel-concrete-steel composite structure

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Shield Building Mockups in the Licensing Basis

Mory Diané - SCANA

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Shield Building Mockups in the Licensing Basis

- The Shield Building mockup program is discussed in Section 3.8.4.8 of the licensing basis
- Section 3.8.4.8 is referenced in license condition 2.D.12.e.1

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Construction Means and Methods

Boris Haranki – CB&I

Licensing Basis Commitment in UFSAR Subsection 3.8.4.8

- The Licensee has committed to incorporate lessons learned from the mockup program into means and methods for concrete placement in the construction inspection program
- This section contains a discussion of standard inspectable means and methods as well as revisions based upon the Vogtle program
- Destructive examination of the mockups proved that the placement met engineering requirements and validates the means and methods

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Existing Inspection Attributes

- Concrete placement inspection based upon guidance in ACI as implemented in specifications
- Standard placement inspections include
  - Lift height
  - Vibration time
  - Vibrator insertion depth
  - Vibration zone of influence
  - In-process concrete attribute testing

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Added Inspections Based on Lessons Learned

Horizontal RC/SC Connection

- Alternate deposition points
- Use of a trough to provide additional pressure
- QC will verify consolidation by observing concrete spilling from vent holes

Tension Ring

- Sequential operation of shut-off valves during module filling

Plan for VC Summer Mockup

- Incorporate lessons learned from Vogtle
- Destructively examine mockups to validate adequacy of means and methods in confirming acceptable concrete placement
- SCANA does not intend to re-perform Impact-Echo or other NDE
  - Successful placement at Vogtle credited as "first plant"
- Develop a report and make any additional recommendations based upon lessons learned

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Questions?

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