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Exelon Experience and Observations with Regulatory Oversight / Inspections of Dry Cask Storage Implementation and Operations

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Dry Cask Storage Requirements

- ✓ Work involves fuel selection, inspection, movement to canisters, storage in overpacks, emergent equipment repairs (contingencies)
- ✓ Scope:

	2010	2011	2012
• Peach Bottom	5	5	6
• Oyster Creek	3	0	4
• LaSalle	3	3	12
• Quad Cities	0	10	4
• Dresden	8	4	8
• Limerick	5	5	6
• Byron	6	0	10
• Braidwood	0	6	0
Total	30	33	50

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Measuring Dry Cask Storage Success

- ✓Safe storage of spent nuclear fuel
- ✓Ensure program compliance with applicable regulations
- ✓Maintain sufficient room in spent fuel pools for plant operations

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ISFSI Pads

- ✓ Casks have been placed on concrete pads for more than two decades
- ✓ Consistent government regulations and inspection requirements that vendors and industry rely on are critical for ISFSI operations.

Continuing delays starting up and executing dry cask storage at Byron, Braidwood and LaSalle

- ✓Delays have been driven by unanticipated concerns raised by NRC inspectors

ISFSI PAD De-Rate for Regulatory Uncertainty

✓ ISFSI Concrete Pad Analysis

- NRC questioned the use of NUREG-6865 in SSI analyses at Byron, Braidwood and LaSalle (among other concerns regarding the analysis)
- There is currently no regulatory guidance on the required dynamic analysis for the ISFSI pad
- Pads designed and built to hold 90 – 100 casks are restricted to ten casks pending additional analysis

NRC ISFSI Inspection program

- ✓ *NRC Inspection Manual, Manual Chapter 2690, "Inspection Program for Dry Storage of Spent Reactor Fuel at Independent Spent Fuel Storage Installations and for 10 CFR Part 71 Transportation Packaging," November 9, 2009 (referred to as "MC-2690").*
- ✓ *The purpose of MC-2690*
- ✓ *While these procedures provide general guidance for NRC site inspectors, they allow latitude for the details of the inspections.*

The GAP

Examples of the gap between the general guidance provided to inspectors and Exelon's recent experience, relevant to the regulatory delays which occurred and continue to occur at Byron, Braidwood and LaSalle

The IP is silent on the methodologies being used to perform these evaluations and the acceptance criteria for use of specific methodologies.

(Note: These three issues – design analyses of the ISFSI pads, seismic stability of the casks inside the Part 50 facility, and single-failure proof design requirements for overhead cranes – have resulted in the most impact to performing ISFSI campaigns at Exelon.)

Experience with NRC Inspections

- ✓ *Prior to 2008 Exelon experience with ISFSI inspections had been generally limited to programmatic level inspections*
- ✓ *Under MC-2690, issued on November 9, 2009, recent NRC inspections have been more detailed, delving into calculations performed by the licensee to show compliance with the CofC and SAR for the dry cask storage system.*

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Current Inspection Experience

- ✓ *NRC Region III inspectors have raised concerns with methodologies used in current 72.212 evaluations*
- ✓ *In many cases NRC inspectors agree that the methodologies used and the analytical results obtained are not necessarily incorrect*

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Current Inspection Experience (2)

- ✓ *In some instances, NRC technical staff have not agreed with the methodology being employed and have advised Exelon to revise its calculations.*
- ✓ *At Exelon this has resulted in difficulties starting up ISFSI facilities*

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Regulatory Improvement

Exelon's 72.212 evaluations for Byron, Braidwood and LaSalle were performed using experience from the 72.212 evaluations performed at Dresden and Quad Cities

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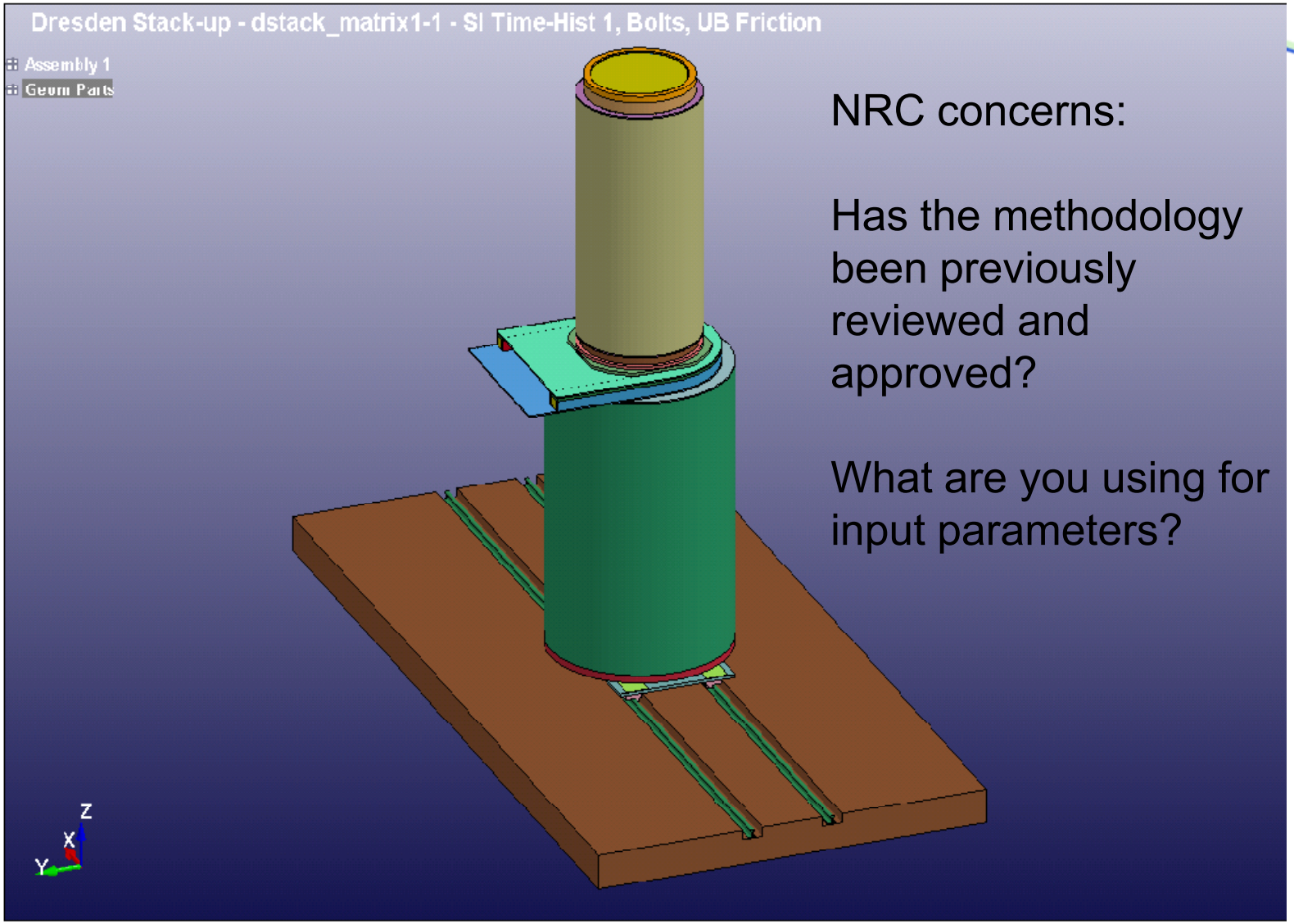
NRC Additional Focus on DCS

- ✓NRC regional inspectors have questioned “freestanding stackup” and other “freestanding” configurations in Part 50 facility



NRC concerns:

Has the methodology been previously reviewed and approved?

What are you using for input parameters?

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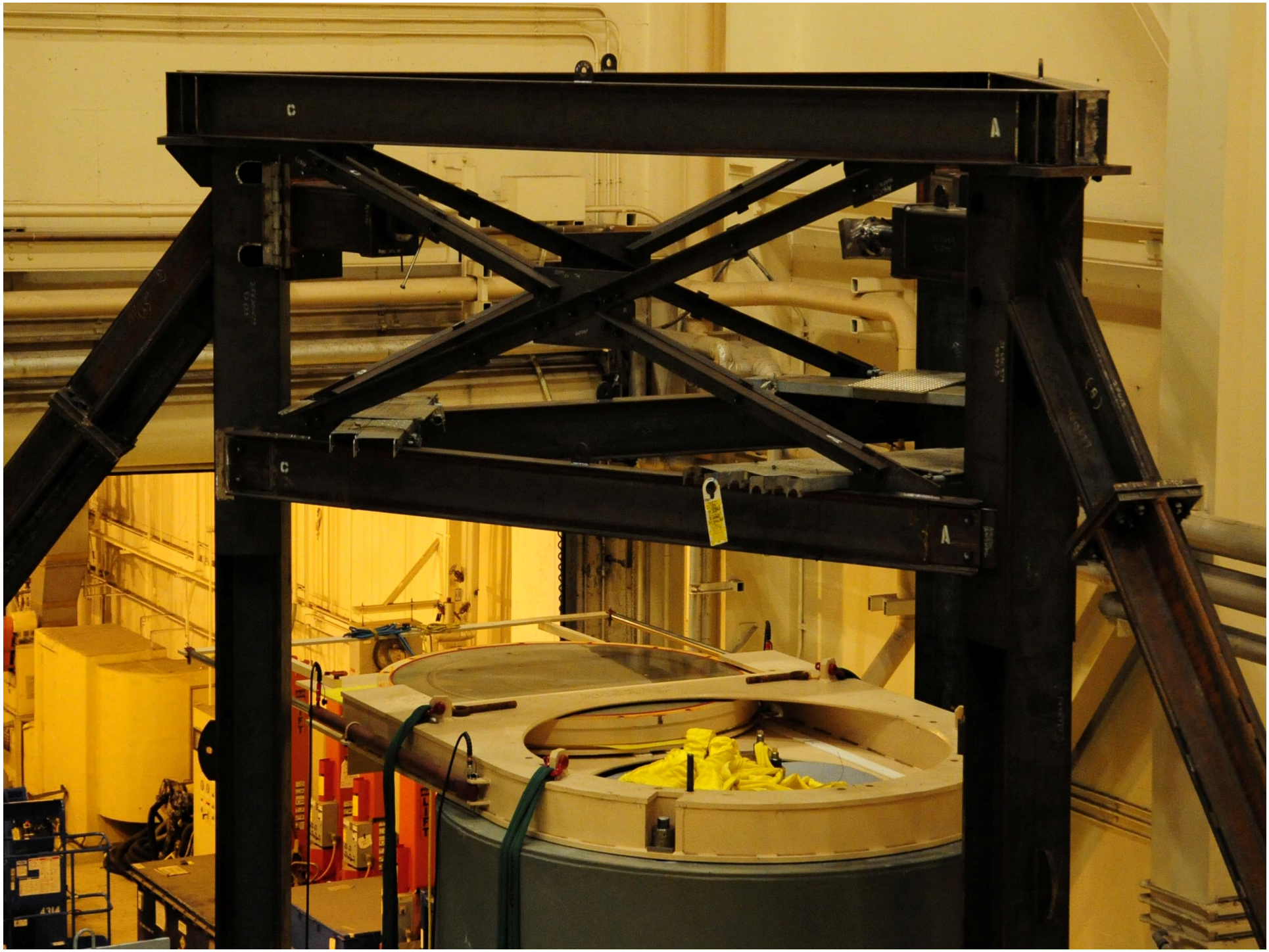
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Stackup

NRC Additional Focus on DCS (cont.)

- ✓ **Overhead crane and reactor building modifications**
  - New seismic analyses for crane supporting structure performed, using FEA model boundary conditions from original design basis

NRC Additional Focus on DCS (cont.)

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NRC OIG Findings

Opportunities Exist to Improve ISFSI Safety Inspector Training

Routine ISFSI Inspection Frequency Varies Among Regions

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NRC OIG Findings

- ✓ *Opportunities Exist to Improve ISFSI Safety Inspector Training*
- ✓ *Routine ISFSI Inspection Frequency Varies Among Regions*

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