



NRC Perspectives on Software QA Implementation

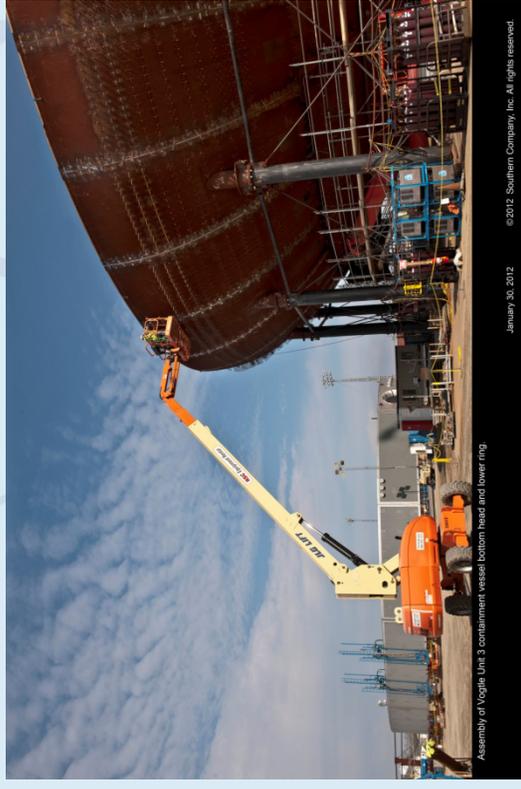
**June 28, 2012
Vendor Workshop**

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Office of New Reactors



Agenda

- Regulatory framework
- Meeting QA requirements
- Software dedication and controls
- Vendor inspections and findings
- Important points

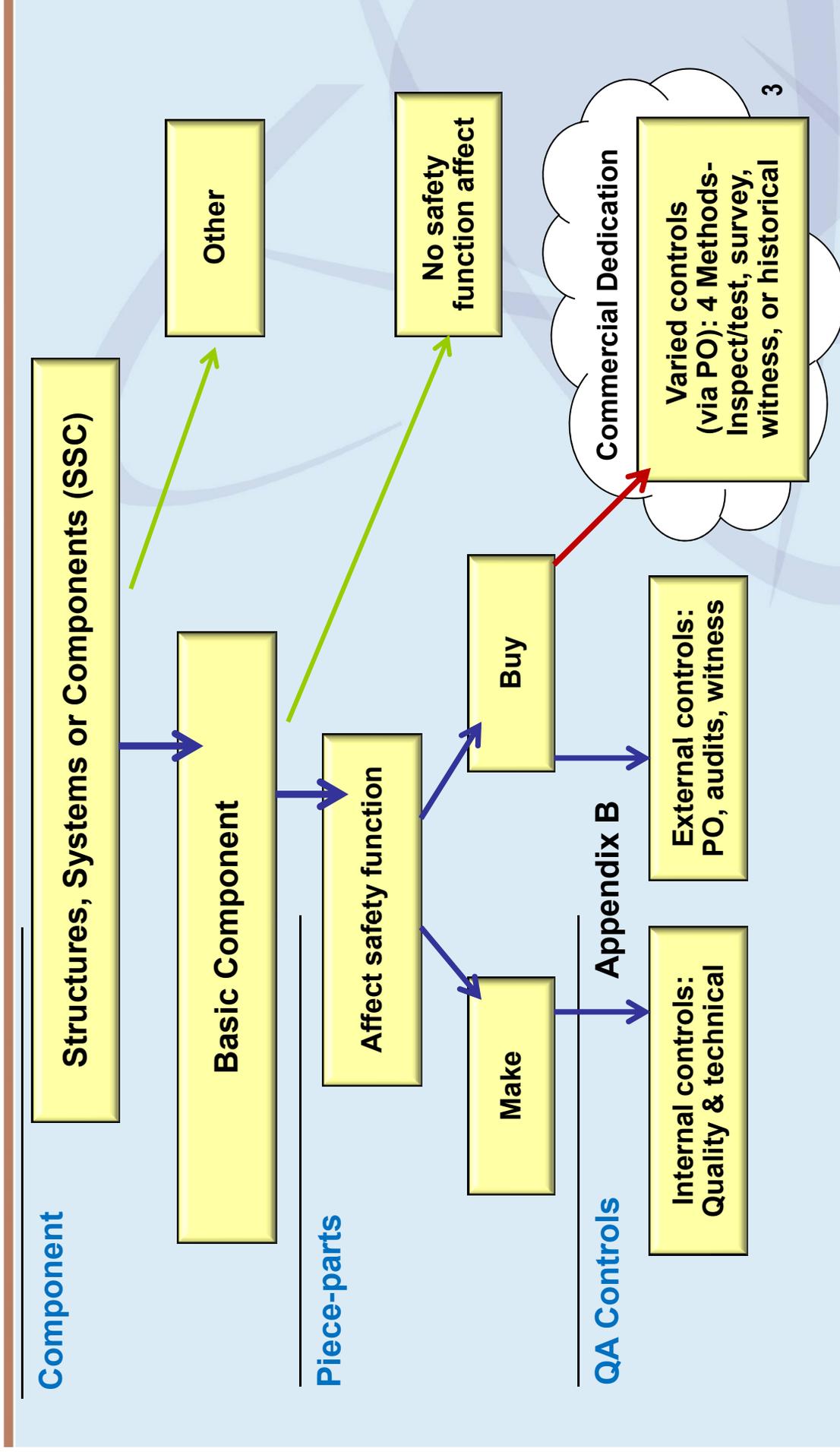


Assembly of Vogtle Unit 3 containment vessel bottom head and lower ring

January 30, 2012

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Component Example



Meeting QA Requirements

- Must meet Appendix B to 10 CFR Part 50
- ASME NQA-1-2008 with 2009 Addenda
 - One option available (www.asme.org)
 - Endorsed by Regulatory Guide 1.28 Rev 4 for design and construction (as modified)
 - Subpart 2.7 specific to software
- Software: evaluate and apply appropriate QA controls

Software Dedication and Control

- Dedication is a process
- Software: the same dedication process
 - Defined dedication process
 - Targeted dedication plan
 - ✓ Identify safety function
 - ✓ Identify Critical Characteristics
 - ✓ Verify acceptability (4 methods)
 - Proper implementation and documentation
- Requires rigor

Meeting Dedication Requirements

- EPRI NP-5652
 - One option available (www.epri.com)
 - Conditionally endorsed by GL 89-02
- ASME NQA-1-2008 with 2009 Addenda
 - One option available (www.asme.org)
 - Subpart 2.7, Section 302 “Otherwise Acquired Software”
 - Subpart 2.14 specific to dedication

Software Dedications

Expectations

- Technically oriented dedication plan
- Providing “reasonable assurance”
 - Multiple dedication methods available
- Special Tests and Inspections (Method 1)
 - Hardware & operating system pairing
 - Installation vs. execution
 - Range of use
- Configuration control
 - patches & updates

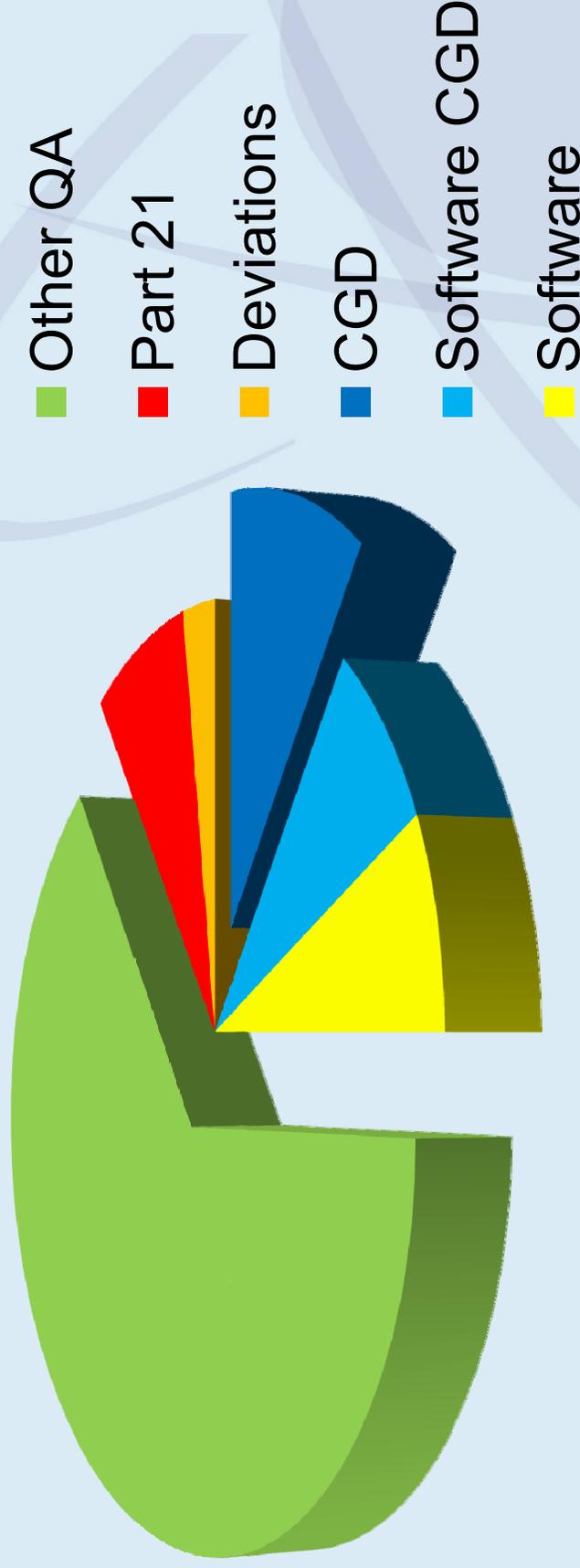
Software Dedications

Expectations

- Commercial Grade Survey (Method 2)
 - To Verify
 - Lifecycles
 - Requirements traceability
 - Layers of review / testing
 - Users manual updates
 - Error (“bug”) control / reporting
- Primarily controlled via purchase order
- Engineering / Technical Specialist participation in surveys

Recent Inspection Findings

Most recent nine inspections: 40 findings/URIs



<http://www.nrc.gov/reactors/new-reactors/oversight/quality-assurance/vendor-insp.html>

Software Inspection Findings

- Process failures
 - Software requirements
 - No review & approvals of documents
 - No traceability to test plan
 - Software CGD
 - Unsuitable comparison models for validation
 - No critical characteristics
 - No acceptance methods
 - No evaluation of error notices

Software Inspection Findings

- Implementation failures
 - Inappropriate CGD technical evaluation
 - Test plan missing acceptance criteria
 - Missing requirements in system specification
 - Verification and validation (V&V) inadequate

Important Points

- Manage software QA control processes
- Evaluate software's impact on basic component
- Increased emphasis on dedication of software
- Important to evaluate software deviations & report defects
- Document all dedication activities

Thank you!!



Aerial view of Vogtle 3 and 4 construction site – Unit 3 on left, Unit 4 on right

March 29, 2012

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