

Regulatory Guide 1.231



***Acceptance of Commercial-Grade
Design and Analysis Computer
Programs for Nuclear Power Plants***

**February 13, 2017
NUPIC Auditors Conference**

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QA Vendor Inspection Branch 1
Office of New Reactors

Agenda

- ▶ Applicability
- ▶ Regulatory framework
- ▶ Requirements & Guidance
- ▶ Regulatory Guide 1.231 status
- ▶ Revision 1 of EPRI 1025243
- ▶ Implementation



Applicability

- ▶ Regulatory Guide 1.231 - limited scope:
 - Safety-related use of Commercial Design & Analysis Computer Programs (CP)
- ▶ EPRI 1025243 methodology is broader:
 - Full acceptance process
 - Many safety classifications
 - Focus is Design & Analysis CP
 - Examples of other CP



Design and Analysis Software

- ▶ Design of structures, systems and components
- ▶ Finite element analysis
- ▶ Piping analysis
- ▶ Seismic analysis
- ▶ Thermal and flow analysis
- ▶ Nuclear physics
- ▶ Electrical system analysis
- ▶ Accident analysis



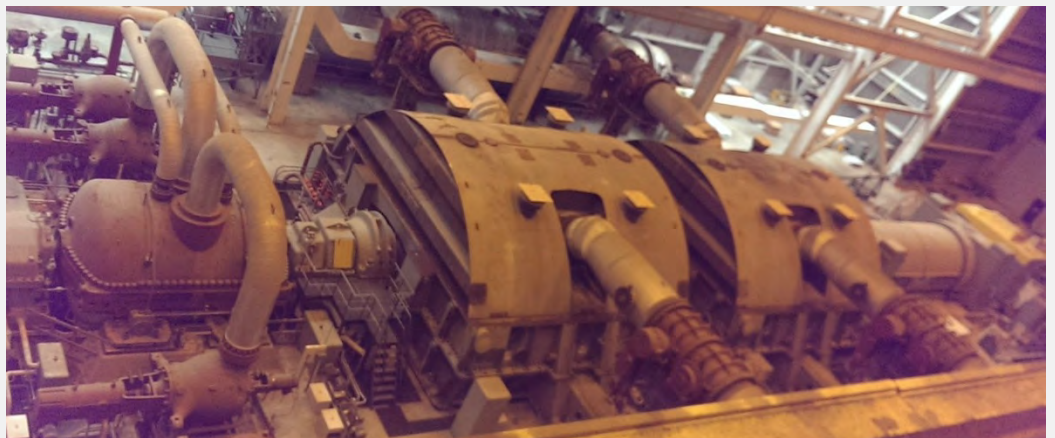
Regulatory Framework

- ▶ *Basic component*
 - Affects safety function
 - Structures, systems, and components (SSC)
 - Part of an SSC
 - Includes safety-related design and analysis
- ▶ *Commercial grade item (CGI)*
 - Affects safety function
- ▶ *Dedication (CGD)*



Requirements

- ▶ Appendix B to Part 50 (QA)
 - Provisions of specific QA program
- ▶ Part 21 (reporting and dedication)
- ▶ Plant licensing basis (licensee)
- ▶ Purchase order requirements (vendor)



Programmatic Guidance

- ▶ Regulatory Guide 1.28, Revision 4
(QA for design and construction)
- ▶ Regulatory Guide 1.33, Revision 3
(QA for operations)
- ▶ NUREG-0800, Section 17.5
“Standard Review Plan”

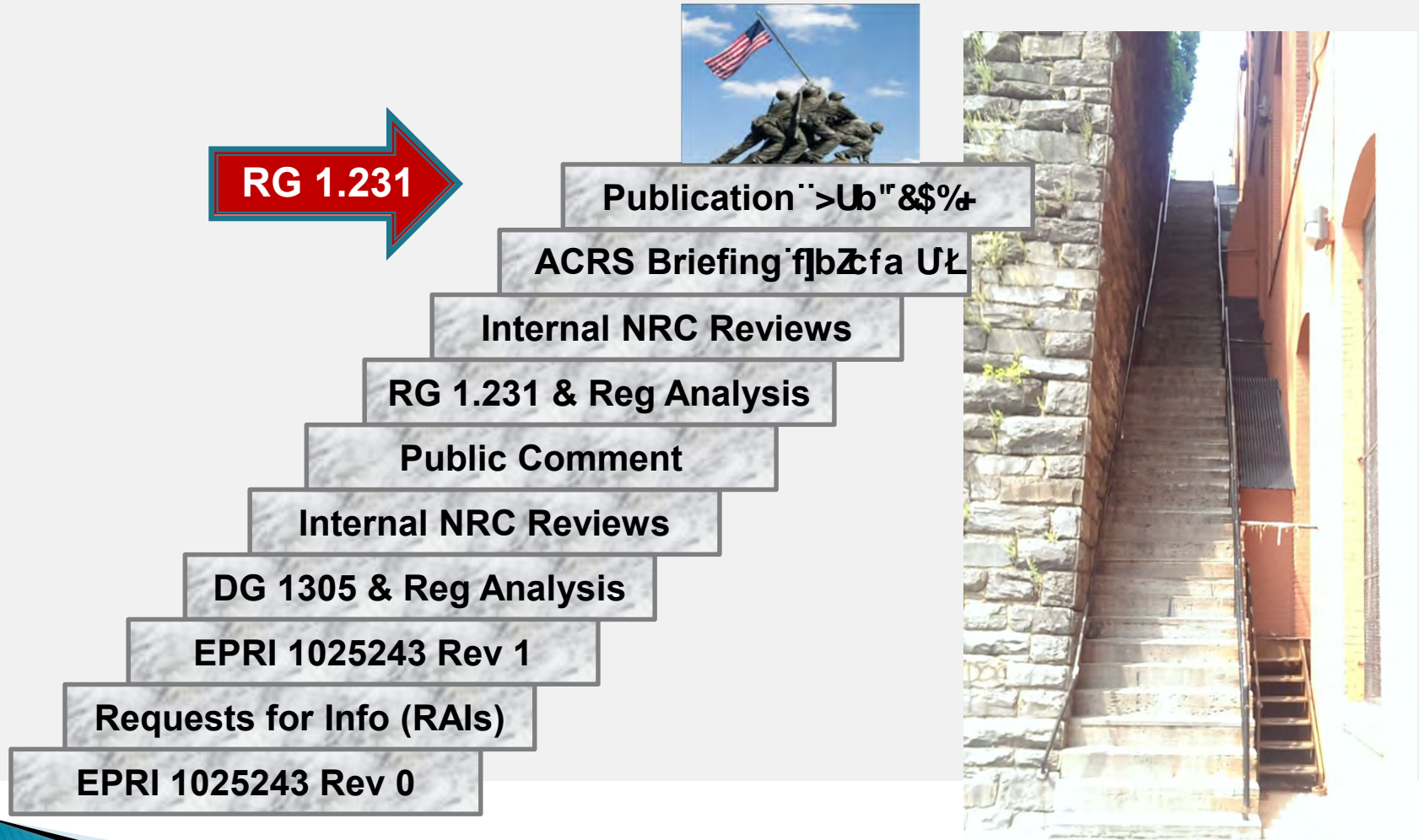


Detailed Guidance

- ▶ Dedication guidance:
 - Generic Letter 89-02 (EPRI NP-5652)
 - Draft Reg Guide 1292 (EPRI 3002002982)
 - Subpart 2.14 of ASME NQA-1-2008/09a
- ▶ Software specific:
 - Subpart 2.7 of ASME NQA-1-2008/09a
 - Reg Guide 1.231 (EPRI 1025243, Rev 1)



Regulatory Guide Process



Locating RG 1.231

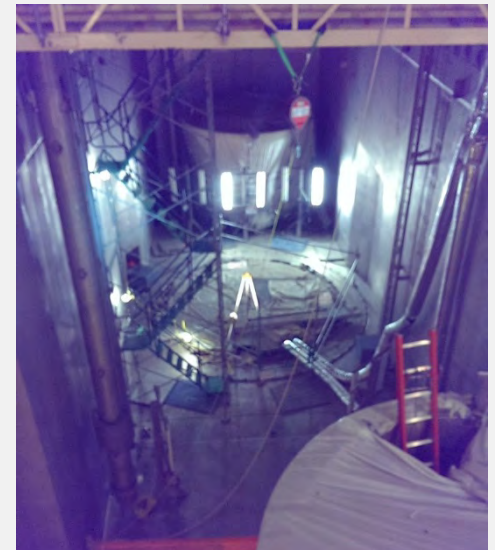


The screenshot shows a web browser window with the address bar displaying "NRC: Document Collections". The main content area is a table with three rows. The first row is a header for "Regulations (10 CFR)". The second row is for "Regulatory Guides (by Division)" and lists ten categories, with "Power Reactors (1)" highlighted in red. A large red arrow with the text "RG 1.231" points to this category. The third row is for "Rulemaking Documents" and lists four categories. Below the table, there is a note: "See also, NRC's Regulations, Rulemaking, and NRC's Plan for Ret Analysis of Existing Rules."

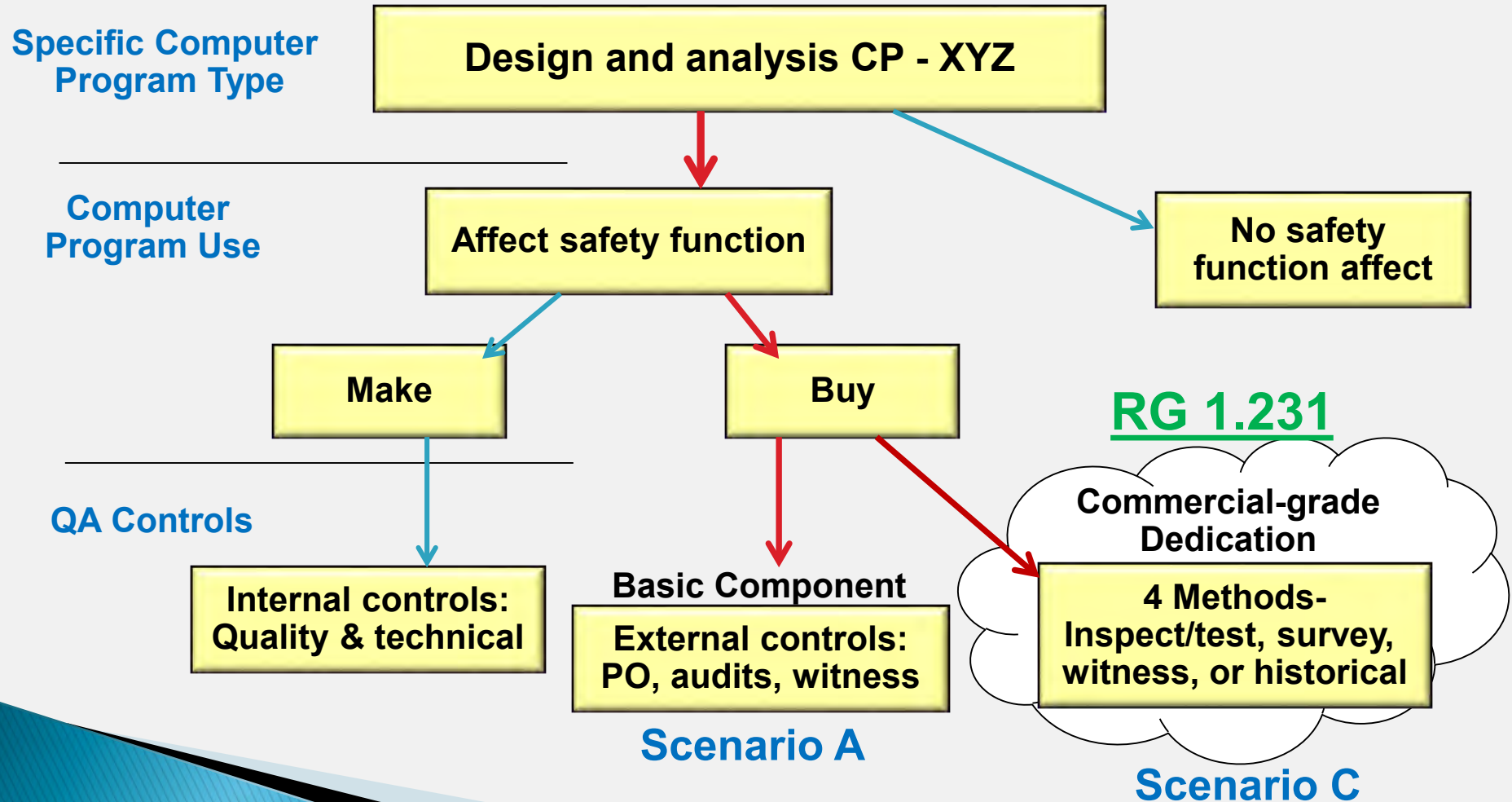
Regulations (10 CFR)	See also Rulemaking Documents
Regulatory Guides (by Division)	<ul style="list-style-type: none">• Power Reactors (1)• Research and Test Reactors (2)• Fuels and Materials Facilities (3)• Environmental and Siting (4)• Materials and Plant Protection (5)• Products (6)• Transportation (7)• Occupational Health (8)• Antitrust and Financial Review (9)• General (10)• Draft Regulatory Guides
Rulemaking Documents	<ul style="list-style-type: none">• Rulemaking Dockets• Petition for Rulemaking Dockets• Unified Agenda and Regulatory Plan• Rulemaking Activities by Fiscal Year <p>See also, NRC's Regulations, Rulemaking, and NRC's Plan for Ret Analysis of Existing Rules.</p>

Regulatory Guide 1.231

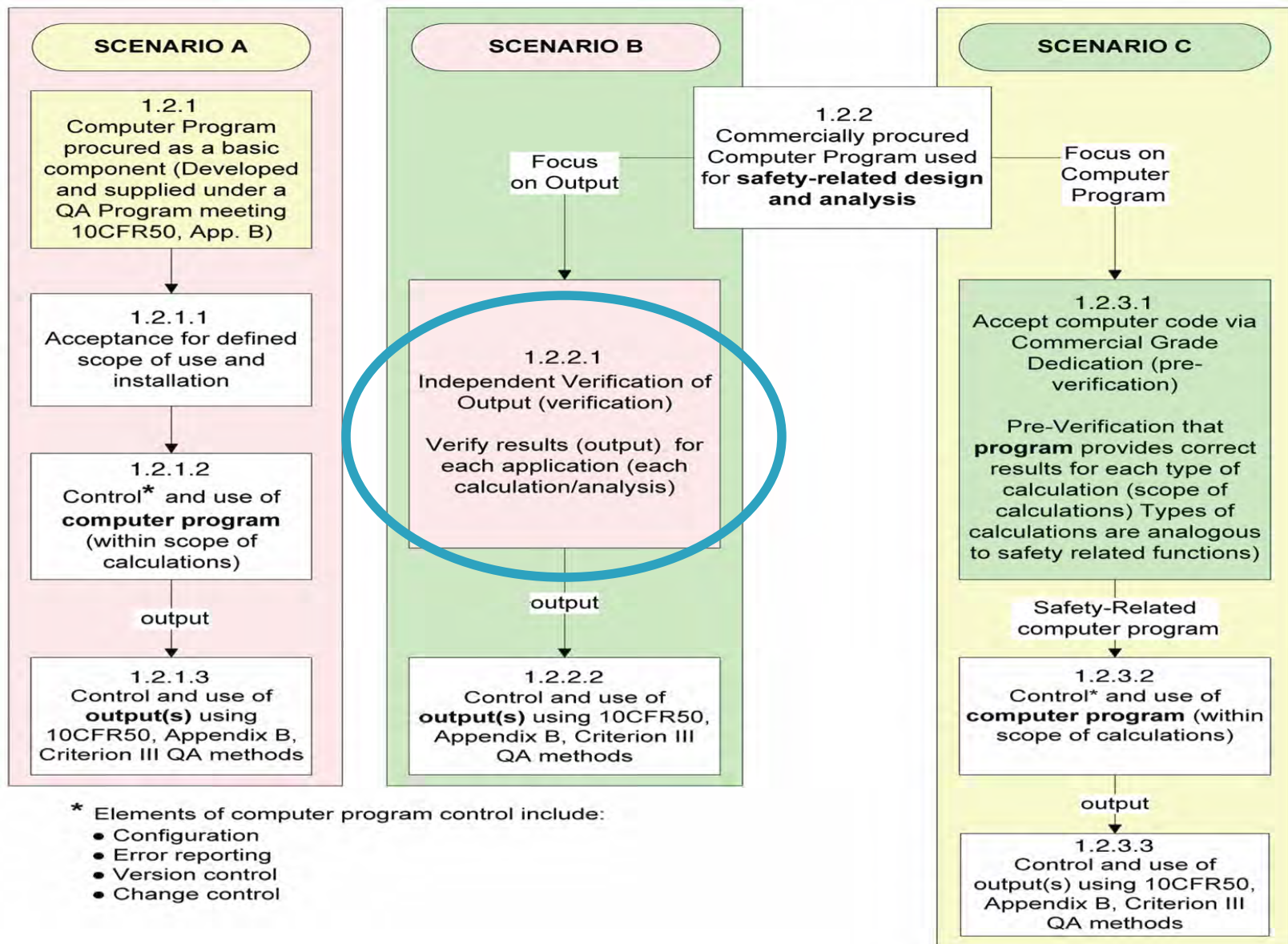
- ▶ Revision 1 of EPRI 1025243 meets:
 - Appendix B to 10 CFR Part 50 requirements, and
 - 10 CFR Part 21 requirements for
 - Dedication of design and analysis CP
- ▶ Regulatory positions:
 - Non-process computer programs only
 - Design and analysis applications only
 - Safety-related classification only



RG 1.231 Focus



EPRI 1025243 Methodology



Implementation

- ▶ Focus of affect on safety function
- ▶ Graded approach
- ▶ Leverage existing control processes
- ▶ Establish and follow process
- ▶ Consider data, computer program and operating environment
- ▶ Configuration control
- ▶ Error control and *Defect* reporting
- ▶ Document-Document-Document

On to the Questions !



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