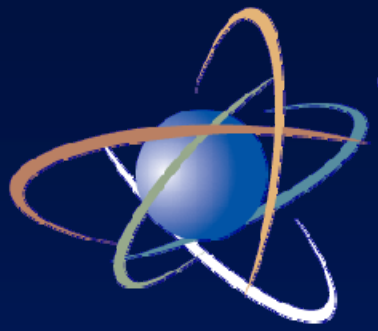


U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Use of Codes and Standards

Carol Moyer
NRC Office of Nuclear Regulatory Research

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Who We Are

- The Energy Reorganization Act of 1974 established the independent U.S. NRC to regulate commercial uses of nuclear material.
- The NRC employs about 4,000 people in its Maryland headquarters and in 4 regional offices in Pennsylvania, Georgia, Illinois and Texas.
- NRC inspectors are assigned to 65 nuclear power plant sites and three fuel facilities.
- Mission: to license and regulate the nation's civilian use of byproduct, source and special nuclear materials to ensure adequate protection of public health and safety, promote the common defense and security, and protect the environment.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

The NRC Regulates:

- Nuclear reactors - commercial power reactors, research and test reactors, new reactor designs;
- Nuclear materials - nuclear reactor fuel, radioactive materials for medical, industrial and academic use;
- Nuclear waste – transportation, storage and disposal of nuclear material and waste, decommissioning of nuclear facilities; and
- Nuclear security – physical security of nuclear facilities and materials from sabotage or attacks.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Our Primary Functions

- Establish rules and regulations
- Issue licenses
- Provide oversight through inspection, enforcement and evaluation of operational experience
- Conduct research to provide support for regulatory decisions
- Respond to emergencies

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC's Policies on Consensus Codes and Standards

- Consensus codes and standards have been integral to the regulatory process for 3 decades
- Codes and standards promote safe operation of nuclear power plants, improve effectiveness and efficiency of regulatory oversight
- Federal law requires Government staff to use consensus standards where possible
  - National Technology Transfer and Advancement Act of 1995
  - OMB Circular A-119

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Staff Participation

- NRC staff participate on codes and standards development committees along with other stakeholders
- Codes and standards are developed based on a rigorous consensus process with input from all stakeholders
- NRC reviews Codes and standards for possible endorsement in regulatory documents

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Formal Endorsement Processes

- Rules / Regulations (10 CFR)
  - Part 20: Standards for Protection Against Radiation
  - Part 50: Domestic Licensing of Production and Utilization Facilities
  - Part 52: Licenses, Certifications, and Approvals for Nuclear Power Plants
- Regulatory Guides (RG)
- Standard Review Plans (SRP)
- Generic Communications

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Other Endorsement Processes

- Safety Evaluation Reports
- Licenses
- Inspection Procedures
- Memoranda
- Regulatory Issue Summaries (RIS)
- Reports (NUREGs)

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

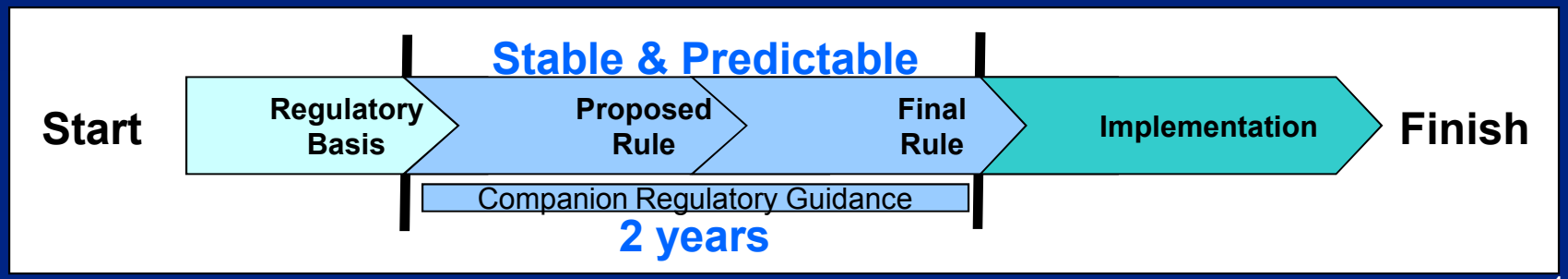
Shortcomings of Informal Processes

- Incomplete treatment of the standard
- Bypasses key agency checks and balances
- Difficulty in establishing the staff position
- Difficult to find in the regulatory record

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Endorsement Process: Rulemaking

- Most formal of NRC endorsement processes
  - About 1% of cited standards
- Standards endorsed in rulemaking process become licensee requirements
- Backfit Rule considered
- Includes public comment and rigorous reviews
- Takes 2-3 years to complete



U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Special Rulemaking: 10 CFR § 50.55a

- Incorporates by reference and requires use of ASME Codes:
  - ASME BPV Code, Section III for design
  - ASME BPV Code, Section XI for in-service inspection
  - ASME OM Code for in-service testing
- Approves, conditions, or disapproves use of ASME Code Cases, via 3 referenced Regulatory Guides
  - Regulatory Guide 1.84 (Section III)
  - Regulatory Guide 1.147 (Section XI)
  - Regulatory Guide 1.192 (OM Code)
- Incorporates by reference two IEEE Standards for Nuclear Power Generating Stations:
  - Standard 279 – Criteria for Protection Systems
  - Standard 603-1991 – Criteria for Safety Systems

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

NRC Endorsement Process: Regulatory Guides

- Describe methods that the staff considers acceptable for use in implementing specific parts of the agency's regulations
- Not substitutes for regulations; compliance with RGs is not required
- Typically have forward-fit applicability
- Best repository of the current staff position
- Includes ACRS, CRGR and public comment reviews
- Takes 1-2 years to complete
- About 41% of cited standards

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Other NRC Endorsed ASME Standards

- ASME NQA-1, "Quality Assurance (QA) Program Requirements for Nuclear Facilities"
  - Referenced in RG 1. 28, "QA Program Requirements"
- ASME QME-1, "Qualification of Active Mechanical Equipment Used in Nuclear Power Plants"
  - Referenced in RG 1.100, "Seismic Qualification of Electrical and Active Mechanical Equipment and Functional Qualification of Active Mechanical Equipment for Nuclear Power Plants"

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

ANS/ASME Standards

- ASME RA-S-2002, "Standard for Probabilistic Risk Assessment for Nuclear Power Plant Applications"
  - Referenced in NRC RG 1.200, "An Approach for Determining the Technical Adequacy of Probabilistic Risk Assessment Results for Risk-Informed Activities"
- ANS/ASME joint program on risk
  - Developing updated and more comprehensive Probabilistic Risk Analysis (PRA) standards for referencing in NRC RG 1.200

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Standards for New & Advanced Reactor Construction

- ASME Boiler & Pressure Vessel Code
  - Changes expected in Section III – Construction
  - Re-start activity on Sec III, Subsection NH – Elevated Temperature Design
  - Section D – Subgroup on Elevated Temperature Design
  - New Working Group on High Temperature Gas Reactors, new Section III, Division 5?
  - New materials and fabrication techniques?

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

International Standards Developers

- International Atomic Energy Agency (IAEA) Safety Standards, Codes of Conduct
- International Standards Organization (ISO) Standards
- International Committee on Radiation Protection (ICRP) recommendations
- NRC participates in the work of these & other organizations, but does not directly endorse their standards

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Conclusions

- NRC makes extensive and effective use C&S as part of its regulatory process
- Regulatory vehicles include regulations, regulatory guides, standard review plans
  - C&S endorsed or cited in all types of regulatory vehicles
- C&S written by numerous standards bodies, domestic & international
- NRC staff participate in writing C&S and have influence in setting the priorities of C&S bodies
- Endorsement of codes & standards creates durable regulatory guidance that is key to improved safety performance