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ASME Nuclear Codes & Standards Efforts to Address Current and New Reactor Needs

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ASME Nuclear Codes & Standards Efforts to Address Current and New Reactor Needs

- ASME Standards and Certification Overview
- Four ASME Nuclear Codes & Standards Success Story Examples
  1. Risk-Informed Inservice Inspection
  2. ASME/ANS Probabilistic Risk Assessment Standard
  3. Response to Alloy 600 Cracking
  4. Enhancing Regulatory Endorsement
- Some Challenges Going Forward
- Summary

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ASME Standards & Certification

VISION

Develop the best, most applicable codes, standards, and conformity assessment programs in the world for the benefit of humanity

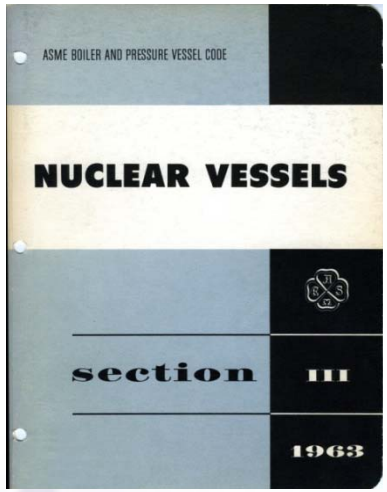
MISSION

Involve the best and the brightest people from all around the world to develop, maintain, and promote the use of these ASME products and services world about

. . . By the Numbers

STANDARDS

- 130 years of service to public safety, lessening the burdens of government, improving the quality of life worldwide
- First Standard issued 1884 –
  - ASME Boiler Code – 100 years ago
  - ***Section III of ASME BPV Code – 50 Years Ago***
- Over 500 Standards
- Over 700 Committees



- More than 5,000 Subject Matter Expert Volunteers – Growing percentage of committee volunteers reside outside of U.S. originating from 52 countries [800 non-U.S.(15%)]
- Administer over 40 U.S. Technical Advisory Groups to the International Organization for Standardization (ISO)

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. . . By the Numbers

TRAINING

- Over 340 Courses – mainly ASME standards based
- Five means of delivery [e-learning, public courses, in-company, licensed, technical seminars]
- Certificate programs being launched targeting nuclear & oil/gas industries
- Recently trained over 10,000 individuals annually
- Introducing Codes & Standards into engineering curricula

CONFORMITY ASSESSMENT

- 2,800 Certified Individuals
- Over 6,700 Certified Companies spanning 75 nations
- Six major programs
- Transitioning from 30 ASME product certification marks to a single mark

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Standardization Areas

Pressure Technology

- boilers, pressure vessels, piping, materials, welding, valves, flanges

Standardization / Performance Test Codes

- geometric dimensioning & tolerancing, plumbing, turbines and plant equipment, fasteners, hand tools, energy assessment, verification & validation

Safety

- elevators & escalators, cranes, automotive lifts, conveyors, rail transit

Nuclear

- ***Component design, containment, QA, ISI, O&M, PRA, air & gas treatment, qual. of mechanical equipment, nuclear cranes***

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Conformity Assessment

Product Certification

- Boilers, pressure vessels, nuclear components
- Nuclear material quality systems
- Bioprocessing equipment (underway)

Personnel Certification

- GDTP - Geometric dimensioning & tolerancing professionals
- Plant operators

Organizational Accreditation

- Authorized inspection
- Pressure relief laboratory testing
- Nuclear NQA-1 certification program

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Four ASME Nuclear Codes & Standards Success Story Examples

1. ASME Boiler & Pressure Vessel Code Section XI – Piping Risk-Informed ISI

Risk-informed ISI Code Cases incorporated into ASME BPV Code Section XI - Non-Mandatory Appendix R, and Application Insights Gained to develop ASME Code Case N-716

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2. ASME/ANS Level 1 Combined PRA Standard – ASME/ANS RA-Sa 2009

ASME, Level 1, LERF Full-power Internal Events

ANS Internal Fire

ANS External Events

ANS Low Power Shut-down

Part 1

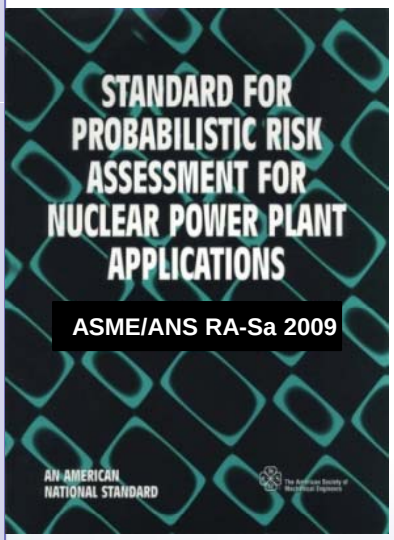
1. Introduction
2. Definitions
3. Application
4. Technical Requirements
5. Configuration Control
6. Peer Review

Part 2
Requirements Applicable to Level 1/LERF, Full-Power, Internal Events

Part 3
Requirements Applicable to Internal Fire

Part 4
Requirements Applicable to External Events

Part 5
Requirements Applicable to Low Power Shutdown



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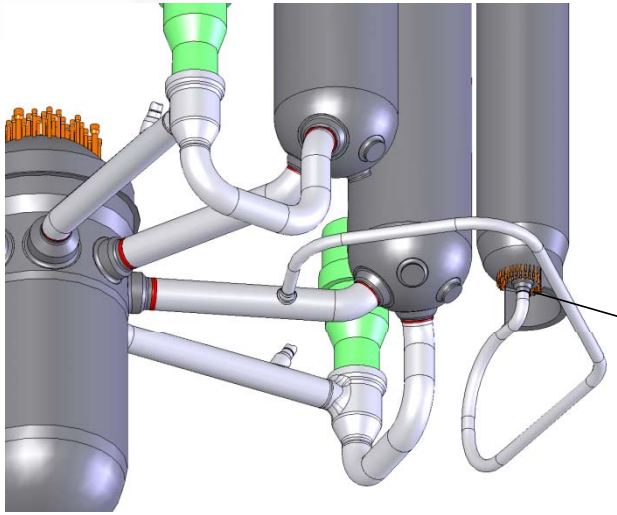
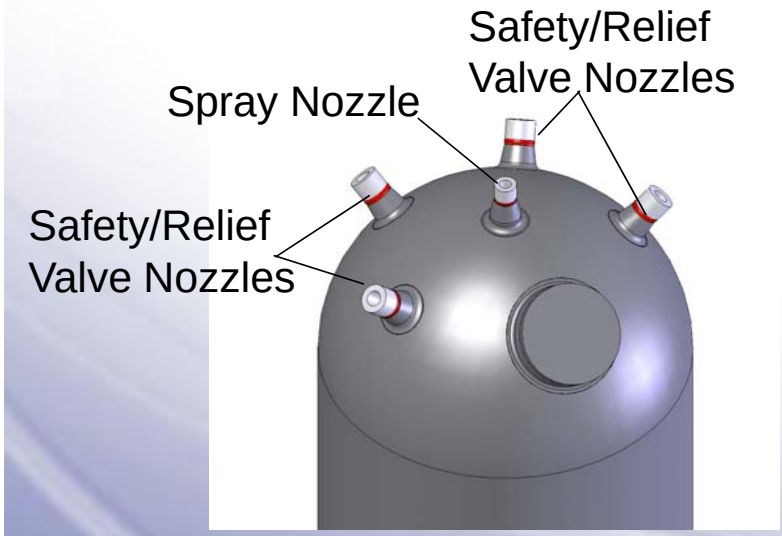
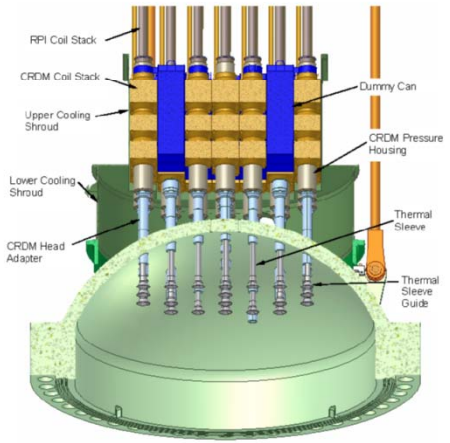
3. ASME BPV Code Section XI Initiatives to Address Component Integrity Issues



Example Weld Locations Fabricated with Alloy 600/82/182 Materials

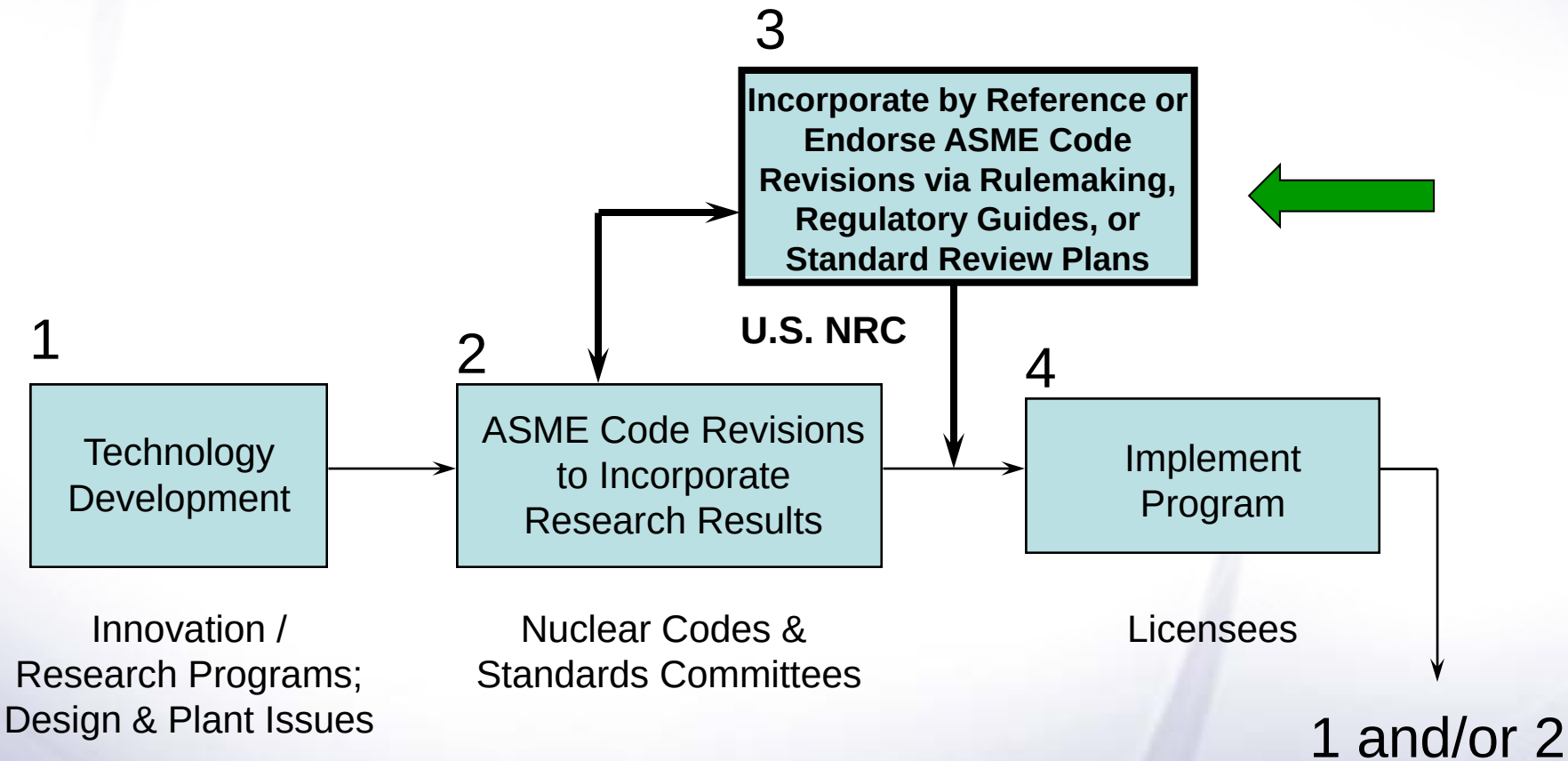
ASME BPV XI Actions: *Code Case N-722*
Code Case N-729
Code Case N-733
Code Case N-770





Reactor Pressure
Vessel Closure Head

4. Enhancing Regulatory Endorsement for Use of New Technology In ASME Nuclear Standards & U.S. Regulations



[*Adapted from input by the late Capt. Robert Bosnak (ret.) of U.S. NRC*]

Some Challenges Going Forward

- Having sufficient ASME volunteer and staff resources to address standards needs for current plants, reactors under construction, and advanced reactors worldwide
- Attracting early career engineers and qualified talent from around the globe to replace ASME volunteers and staff nearing retirement
- Developing standards in a post-Fukushima environment as more plants go into extended license periods month-by-month
- Addressing issues inhibiting full use of PRA in a risk-informed regulatory framework

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Summary

- ASME Standards and Certification continues to extend its reach around the globe supporting a multitude of energy and workforce development initiatives
- A range of emerging trends in the U.S. and around globe pose both challenges and opportunities in Nuclear Codes & Standards development
- As we have done for more than a century, ASME volunteers and staff will develop solutions to address the challenges and opportunities that we collectively face

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