

# **ASME OM**

# **Operation and Maintenance of Nuclear**

# **Power Plants**

## **BNCS GLOBALIZATION EFFORTS**

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# Presentation Outline

- Committee Charter
- Published Products
- O&M Committee Organization
- O&M Committee Activities
- The Need for IST?
- Scope of Equipment in an IST Program and Code Approach to Testing.

# Committee Charter

## **Committee on Operation and Maintenance:**

To develop, review, maintain, and coordinate codes, standards, and guides applicable to the safe and reliable operation and maintenance of nuclear power plants.

# Published Products

- ASME OM-2012 is the latest version
  - OM Code
  - OM Standards
  - OM Guides
- Code Cases
- Code / Technical Inquiries
- New OM document in 2014

# ASME OM – Edition Date

- Division 1 – Section IST (ASME OM Code)
- Division 2 – Standards (ASME OM S/G)
- Division 3 – Guides (ASME OM S/G)
- Interpretations
- Code Cases

ASME OM-2012  
(Revision of ASME OM-2009)

## Operation and Maintenance of Nuclear Power Plants

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# Division 1 – OM Code

- Title: Rules for Inservice Testing of Light Water Reactor Power Plants (Section IST)
- Subsections:
  - ISTA General Requirements
  - ISTB Pump IST Requirements (pre-2000 plants)
  - ISTC Valve IST Requirements
  - ISTD Snubber IST Requirements
  - ISTE Risk-Informed IST Requirements
  - ISTF Pump IST Requirements (post-2000 plants)
  - Mandatory Appendices
  - Non-mandatory Appendices

# Mandatory Appendices

- Appendix I - Inservice Testing of Pressure Relief Devices in Light-Water Reactor Nuclear Power Plants
- Appendix II - Check Valve Condition Monitoring Program (Performance Based)
- Appendix III - Preservice and Inservice Testing of Active Electric Motor Operated Valve Assemblies in Light-Water Reactor Power Plants
- Appendix IV - Preservice and Inservice Testing of Active Pneumatically Operated Valve Assemblies in Light-Water Reactor Power Plants. (Approved and in public review at this time)
- Appendix V - Pump Periodic Verification Test Program

# Non-Mandatory Appendices

- A - Preparation of Test Plans
- B,C,D,E,F,G - Dynamic Restraint (Snubber)  
Non-Mandatory Appendices
- J - Check Valve Testing Following Valve Reassembly
- K - Sample List of Component Deterministic Considerations
- L - Acceptance Guidelines
- M - Design Guidance for Nuclear Power Plant Systems and Component Testing .



# Division 2: OM Standards

- Subsections:
  - Part 3: Vibration Monitoring of Piping Systems
  - Part 12: Loose Parts Monitoring
  - Part 16: Performance Testing and Inspection of Diesel Drive Assemblies
  - Part 21: Inservice Performance Testing of Heat Exchangers
  - Part 24: Reactor Coolant and Recirculation Pump Condition Monitoring
  - Part 26: Determination of Reactor Coolant Temperature from Diverse Measurements
  - Part 28: Standard for Performance Testing of Systems
  - Part 29: Alternative Treatment Requirements for RISC-3 Pumps and Valves

# Division 3: OM Guides

- Subsections
  - Part 5: Inservice Monitoring of Core Support Barrel Axial Preload in Pressurized Water Reactor Power Plants
  - Part 7: Requirements for Thermal Expansion Testing of Nuclear Power Plant Piping Systems
  - Part 11: Vibration Testing and Assessment of Heat Exchangers
  - Part 14: Vibration Monitoring of Rotating Equipment in Nuclear Power Plants (currently being converted to standard)
  - Part 19: Preservice and Periodic Performance Testing of Pneumatically and Hydraulic Operated Valve Assemblies
  - Part 23: Inservice Monitoring of Reactor Internals Vibration in Pressurized Water Reactor Power Plants

# Code Cases

## Apply to

- General Requirements
  - Pump IST
  - Valve IST
  - Snubber IST
  - Risk-Informed IST
- 
- A code case is the official method of handling a reply to an inquiry when study indicates that the Code wording needs clarification, or when the reply modifies the existing requirements for the Code, or grants permission to use alternative methods.
  - Some code cases will eventually be incorporated into the Code and then annulled.

# Technical Interpretations

- Technical Interpretations are formal written responses to written inquiries which are transmitted to the inquirer
- Interpretations shall be written in an “inquiry” and “reply” format
- Interpretations shall not revise existing requirements or establish new requirements
- Interpretations shall be transmitted to the inquirer on ASME interpretation letterhead signed by the staff person responsible for administrative activities of the standards committee or cognizant subcommittee.

# O&M Committee Organization

- Main Committee (the consensus committee)
- Executive Committee – OM leadership for strategic and long term planning
- Subcommittee for OM Code
  - various subgroups/ Task groups (Pumps, Valves, Snubbers, Risk informed, New Reactors)
- Subcommittee for OM Standards / Guides
  - Various subgroups/task groups to support the development and maintenance of the S/G's.
- Special Committee for Standards Planning
  - Review and direction of Code, Standards and Guides scopes and direction
- Task Group on New Reactors
  - Review of all possible changes to the Code as it relates to new reactor technology. These are noted as Post 2000 Plants.

# O&M Committee Activities

- Winter Meeting (annual)
  - Location is typically Clearwater Beach, FL
- Summer Meeting (annual)
  - Various locations around the USA
- Pump / Valve / Snubber Symposium (triennially in the summer)
  - Location is typically Rockville, MD

# The Need for IST?

- IST is part of the Preventive Maintenance process.
- Condition Maintenance
- Overhaul Maintenance
- Predictive Maintenance
- Scheduled Maintenance
- *Inservice Testing*
- Inservice Inspection

# Intent or Rational for Inservice Testing (IST)

**Ensure** operational readiness of Safety Systems by periodically testing the functionality of the active components (pumps, valves, snubbers) in these systems.



# Scope of Equipment in an IST Program

- Components that have functions in safety Systems, namely:
  - Shutting down a reactor to a safe shutdown condition
  - In maintaining the safe shutdown condition
  - In mitigating the consequences of an accident
  - Pressure relief devices that protect systems or portions of systems that perform one or more of these three functions
  - Dynamic restraints (snubbers) used in systems that perform one or more of these three functions or to ensure the integrity of the reactor coolant pressure boundary

# ASME OM Code Definitions

- Inservice Test:

*“A test to determine the operational readiness of a system, structure, or component after first electrical generation by nuclear heat.”*

- Operational Readiness:

*“The ability of a component to perform its specified functions.”*

# Establishing IST Program Scope

- The scope of the IST pump program must include ASME Code Class 1, 2, and 3 components provided with an emergency power source, that are required in shutting down a reactor to the safe shutdown condition, maintaining the safe shutdown condition, or mitigating the consequences of an accident.

# ASME Code Classifications

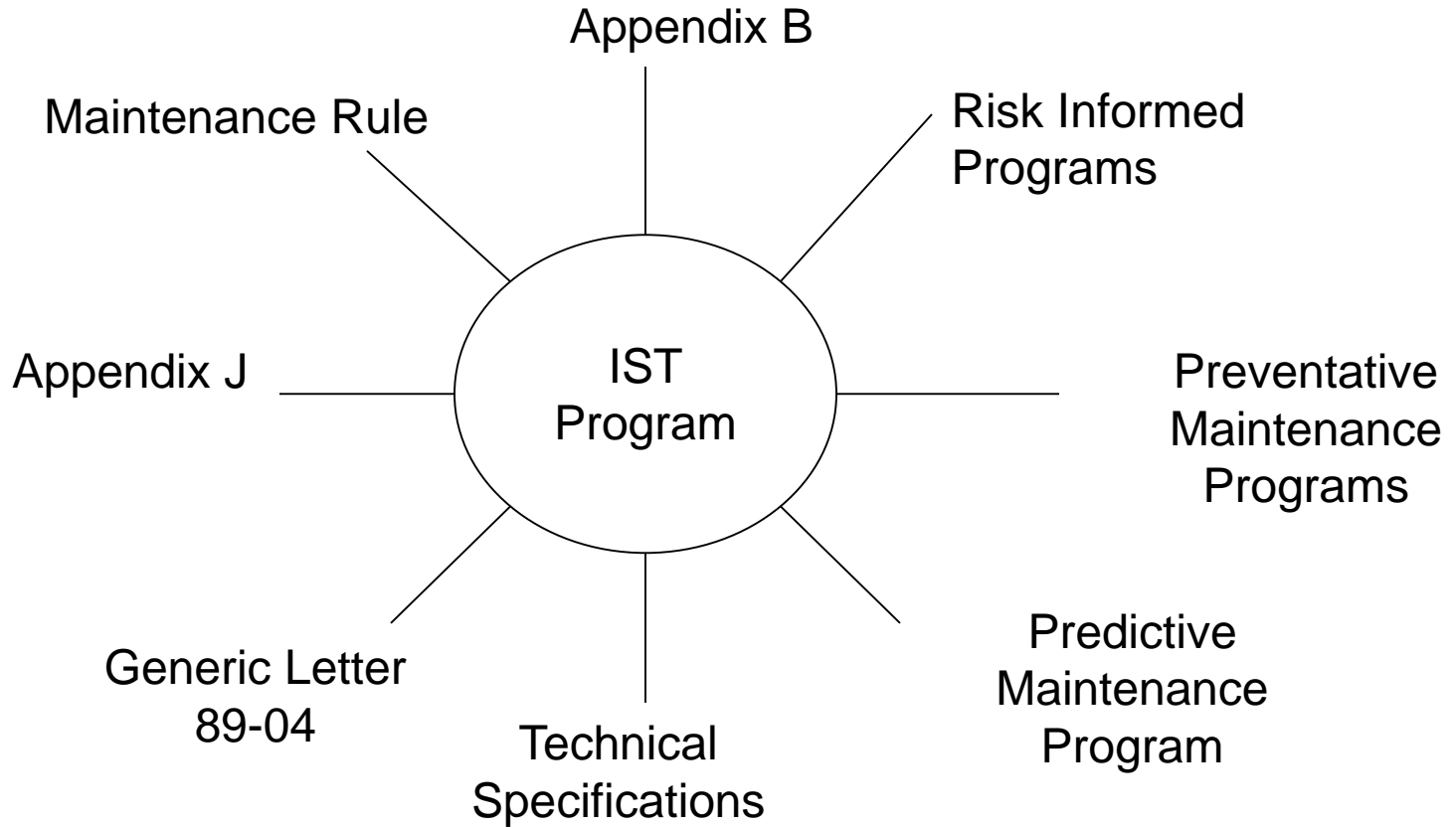
- Code Class 1: reactor coolant system (RCS) pressure boundary
- Code Class 2: components in systems connected to RCS
- Code Class 3: systems that affect the function of the RCS (e.g. auxiliary feedwater, radioactive waste)

# Typical Extent of IST Program (single unit NPP)

- 500 to 700 valves
- 30 to 40 pumps
- 100 to 1000 snubbers

**Note – these active components tend to be relatively high risk components ..... will likely affect the plant Core Damage Frequency (CDF).**

# Typical IST Program Interrelationships



# ASME OM Committee

- **Future activities**

- Continue development of code requirements for new generation reactors (Gen IV, SMR's, Squib Valves)
- Development of special treatment requirements for Non Safety Related Systems (RTNSS) program that includes non-safety related components that have high safety significance.
- Incorporate newly approved Mandatory Appendix IV for air-operated valves (AOVs).
- Initiate development of a mandatory appendix for hydraulic operated valves (HOVs) and other power-operated valves (POVs).
- Clean up applicable technical issues associated with ASME OM Code.
- Develop guidance for preparation of IST program descriptions by COL applicants in support of COL applications under 10 CFR Part 52 for new reactors.

# Questions

