

ASME Advanced Reactor Standards Development NRC, DOE, and National Laboratory Support

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Facilities**

New & Advanced Reactors: Codes and Standards

NRC Meeting April 4, 2024



Overview

- ASME Overview
- Existing activities supported by the agencies (NRC, DOE and the National Labs) and requests for additional collaboration

ASME Facts and Figures

Established in 1880 and headquartered in New York City, the American Society of Mechanical Engineers is a not-for-profit international society.



90,000+

Worldwide
Membership



135+

Countries with ASME
Members



25+

Conferences Conducted
Annually



200+

Technical Courses &
Master Classes Offered
Annually

Offices: New York, NY; Washington, DC; Little Falls, NJ; Houston, TX; Beijing, China; and New Delhi, India

NRC Meeting April 4, 2024



Setting the Standard

Used in 100+ Countries

ASME is an international Standards Development Organization

- Accredited by ANSI
- Development process adheres to the principles and procedures outlined in the World Trade Organization's (WTO) Agreement on Technical Barriers to Trade (TBT) for development of international standards

500+ Standards & Products

Pressure Vessels, Piping, Nuclear Technologies, Elevators/Escalators, Cranes, Performance Testing, etc.

5,500+ Dedicated Volunteers

Engineers, Researchers, Government officials, etc. enhancing public safety, health, and quality of life

Transparency

Impartiality and Consensus

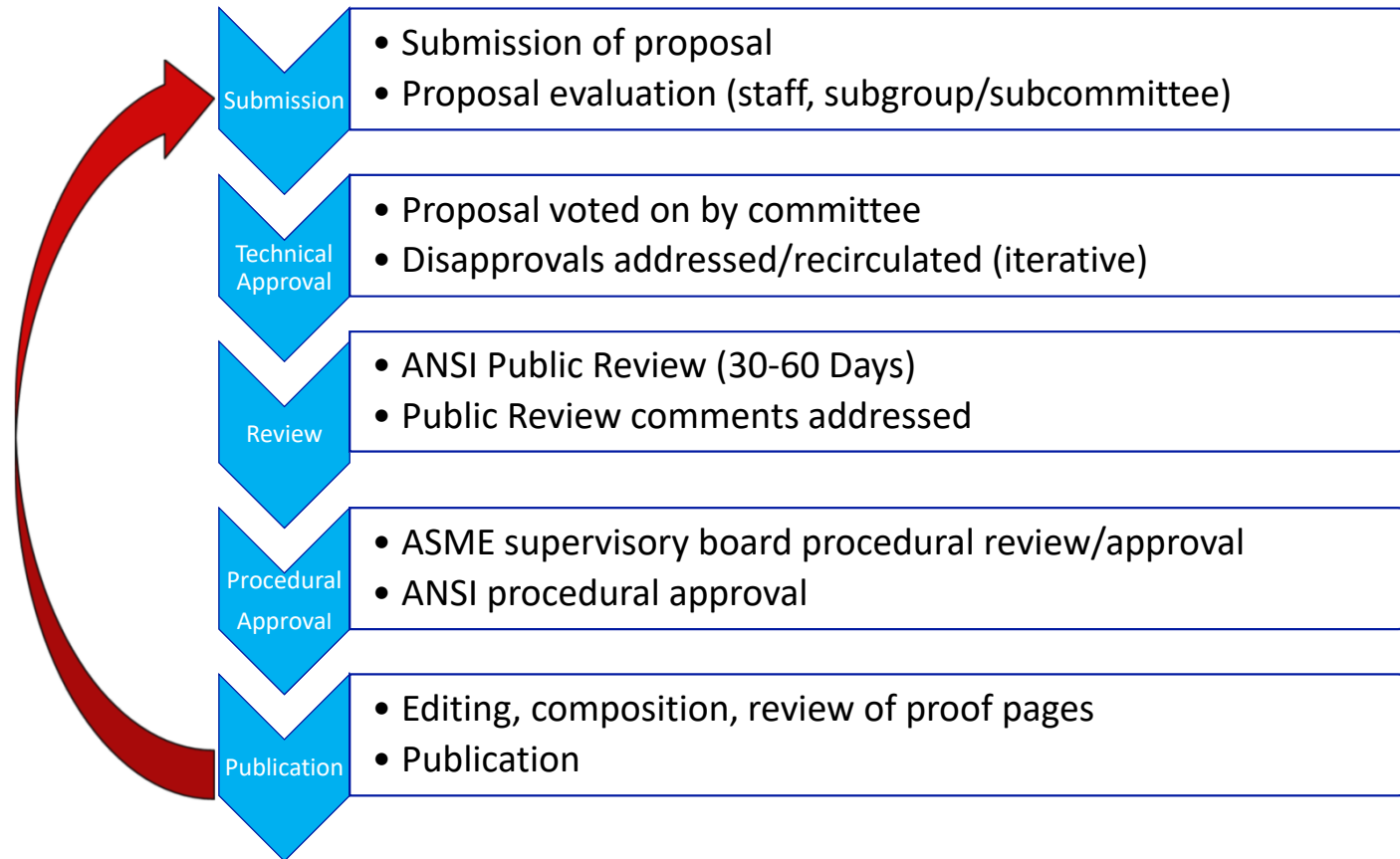
Coherence

Openness

Effectiveness and Relevance

Development Dimension

ASME Consensus Process



Presentation updated 3-10-23

The ASME Advantage

Maturity of our Standards

- Over 100 yrs. of consensus developed content that advances with technology and ensures high quality products and a commitment to overall public safety

Continuous Improvement

- ASME standards development committees continuously work to incorporate engineering lessons learned and advances in technology into the standards to ensure that the standards remain relevant and meet the needs of the industry.

Globally recognized and accepted

- Codes, Standards, and Conformity Assessment requirements aid manufacturers in the development and implementation of Standard through a Quality System in the manufacturing of boilers, pressure vessels, and pressure piping, etc.

Conformity Assessment Program

- ASME Conformity assessment allows the recognition of a company's or individual's capability to fulfill the requirements of an ASME standard in order to advance public safety and facilitate international commerce.

NRC, DOE and National Laboratories Current Activity

NRC Meeting April 4, 2024



ASME, Department of Energy and National Laboratories

DOE and National Lab Input

- Research
- Representation on standards committees
- DOE representation on the Board

Standards Development

- Working with industry to develop consensus standards associated with systems, equipment, or materials used by the nuclear industry.

DOE Orders and Guides

- Developing and revising orders and guidance documents

Nuclear Regulatory Commission

NRC Input

- Representation on ALL ASME Nuclear standards committees and most subordinate groups at the technical working level
- NRC Representation on the Board
- NRC Management Meetings

Standards Development

- Working with industry to develop consensus standards associated with systems, equipment, or materials used by the nuclear industry.

NRC Regulations and Regulatory Guides

- Rulemaking – Developing and amending regulations that licensees must meet
- Guides – Developing and revising guidance documents such as regulatory guides

ASME Nuclear Standards – BPV III

BPV III - Construction of Nuclear Facility Components

- Division 1: Metallic vessels, heat exchangers, storage tanks, piping systems, pumps, valves, core support structures, supports, and similar items.
 - Division 2: Concrete containment vessels with metallic liners
 - Division 3: Storage and transportation containments and their internal support structures for spent fuel and high-level radioactive material and waste.
 - Division 4: Fusion Energy Devices
 - Division 5: High temperature reactors providing rules suitable for construction of gas and liquid cooled reactors and are under a more active development to meet the evolving needs of our advanced reactor stakeholders
 - Related committees and BPV II, V, IX & XIII Service Sections
 - BPV III Code Cases
- NRC Participation – Yes, representation on the standards committees and most subordinate groups at the technical working level
 - DOE or National Lab Participation – Yes on some committees
 - **Requests:**
 - Some items have been discussed at the NRC management meeting
 - Continued support for materials research to support BPV III Division 5 Code Cases (e.g. Alloy 709) and expanded support for assessment of more materials.

ASME Nuclear Standards - BPV XI

BPV XI – Nuclear Inservice Inspection

- Division 1: Inspection and Testing of Components of Light-Water-Cooled Plants
- Division 2: Reliability Integrity Management (RIM) A methodology to establish Inservice Inspection criteria independent of the SMR technology (e.g., Molten Salt, HTGR, Liquid Metal, etc.) Alternative approach to current ISI activities, needed to accommodate new technologies.
- BPV XI Code Cases
- NRC Participation – Yes, representation on the standards committees and most subordinate groups at the technical working level
- DOE or National Lab Participation – Yes, National Lab participation on XI, Div. 2. But we don't have DOE participation, except through the labs. We would welcome direct DOE participation, unless DOE considers Lab Participation sufficient.
- Requests
 - Some items have been discussed at the NRC management meeting.
 - NRC told us they will include XI, Div. 2 Cases in the Regulatory Guide (RG) 1.246, the Reg Guide that endorses Div. 2. This seems a little slow and awkward, but should work for now. The process could be improved.

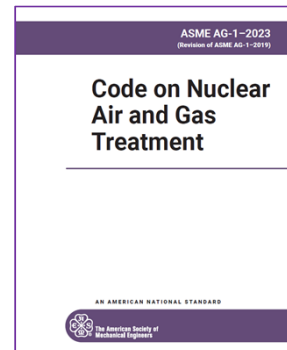
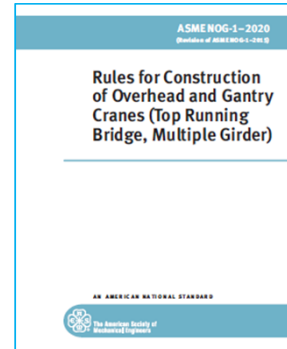
ASME Nuclear Standards – CNF and CONAGT

CNF Cranes for Nuclear Facilities

- HRT-1 - Rules for Hoisting, Rigging, and Transporting Equipment for Nuclear Facilities
 - NML-1 Rules for the Movement of Loads using Overhead Handling Equipment in Nuclear Facilities
 - NOG-1 - Rules for Overhead and Gantry Cranes
 - NUM-1 - Rules for Cranes, Monorails, and Hoists (with Bridge or Trolley or Hoist of the Underhung Type)
 - OCS-1 Overhead Crane Safety Engineering: A Guide for Performing a Failure Modes and Effects Analysis (FMEA) and for Implementing a Crane Control Monitoring System (CCMS) for Enhanced Safety Cranes
- NRC Participation – Yes, representation on the standards committees and most subordinate groups at the technical working level
 - DOE or National Lab Participation –No, but they would be welcome.
 - **Request currently being discussed:** DOE-STD-1090-2020 parallels the recently published NML-1-2019 standard which is titled “Rules for the Movement of Loads using Overhead Handling Equipment in Nuclear Facilities”. NML-1 was written so that it can be used at any facility that may have overhead handling lifts, especially those that require some special considerations. I think it may benefit your organization’s operations—it could apply to any DOE facility, not just nuclear ones.

CONAGT Committee on Nuclear Air and Gas Treatment

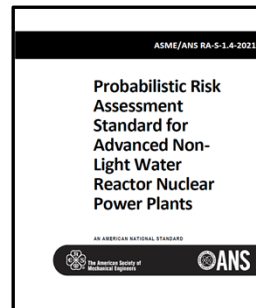
- AG-1 Code on Nuclear Air and Gas Treatment
 - N511 In-service Testing of Nuclear Air Treatment, Heating, Ventilating, and Air Conditioning Systems
- NRC Participation – Yes, representation on the standards committee
 - DOE or National Lab Participation – Yes.



ASME Nuclear Standards

JCNRM Nuclear Risk Management – Joint Committee with ANS

- RA-S-1.1 Standard for Level 1/Large Early Release Frequency Probabilistic Risk Assessment
 - RA-S-1.2 Severe Accident Progression and Radiological Release (Level 2) PRA Standard for Light Water Reactors (LWRs)
 - RA-S-1.3 Standard for Radiological Accident Offsite Consequence Analysis (Level 3 PRA) to Support Nuclear Installation Applications
 - RA-S-1.4 Probabilistic Risk Assessment Standard for Advanced Non-Light Water Reactors
 - 58.22(RA-S-1.6) Requirements for Low Power and Shutdown Probabilistic Risk Assessment
 - RA-S-1.5 Probabilistic Risk Assessment Standard for Advanced Light Water Reactor Nuclear Power Plants – In development
 - RA-S-1.7 Multi-Unit Probabilistic Risk Assessment (Level1 +LERF) – in development
 - RI-Security Risk Informed Security – In development
- NRC Participation – Yes, representation on the standards committees and subordinate groups at the technical working level.
 - DOE or National Lab Participation – Yes, DOE membership on the standards committee.



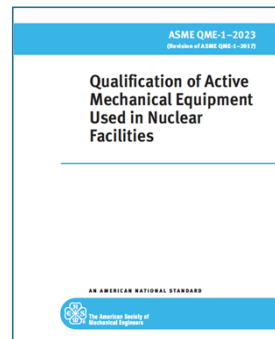
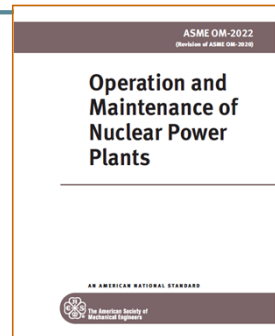
ASME Nuclear Standards – OM and QME

OM Operation and Maintenance

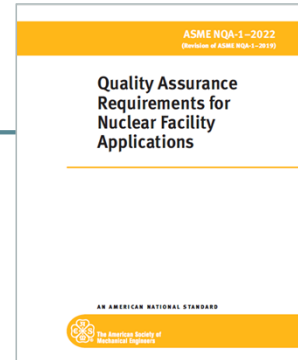
- OM-2022 Operation and Maintenance of Nuclear Power Plants
- OM-2 Rules for Inservice Testing Requirements for Pumps, Valves, and Dynamic Restraints at Nuclear Facilities. Expected in 2024
- OM-NRC Symposium – July/August 2025 In Washington D.C. area
- NRC Participation – Yes, representation on the standards committee.
- DOE or National Lab Participation – No, but they would be welcome.
- Request – NRC Staff is working to complete OM-2 acceptance in a Regulatory Guide once it is approved. Continued support of this effort is requested.

QME Qualification of Mechanical Equipment

- QME-1 - Qualification of Active Mechanical Equipment Used in Nuclear Facilities – currently out for ballot to simplify the code, make is more applicable to non-light water reactors and remove the term “active”
- NRC Participation – Yes, representation on the standards committees
- DOE or National Lab Participation – Yes, representation from national labs.
- Request - NRC staff plans to prepare Revision 5 to RG 1.100 to accept the ASME QME-1-2023 Standard and the reformatted QME-1 Standard (when available). Continued support of this effort is requested.



ASME Nuclear Standards – NQA and PSD



NQA Committee on Nuclear Quality Assurance

- NQA-1 Quality Assurance Requirements for Nuclear Facility Applications
- NQA.TR Evolution of Quality Assurance Principles and Requirements in the US Nuclear Industry
- NRC Participation – Yes, representation on the standards committees and most subordinate groups
- DOE or National Lab Participation – Yes, representation on the standards committees and most subordinate groups
- No requests.

Plant Systems Design - PSD-1 in development expected 2024-5

- A technology neutral standard for design of plant systems for nuclear and fossil power, petrochemical, chemical, and hazardous waste plants and facilities. The standard will provide processes and procedures for design organizations to:
 - integrate process hazard analysis in the early stages of design;
 - incorporate and integrate existing systems engineering processes, practices and tools with traditional architect engineering design processes,; and
 - integrate risk informed probabilistic design methodologies with traditional deterministic design.
- NRC Participation – Yes Representation on the standards committees and subcommittee for risk evaluations
- DOE or National Lab Participation – No DOE participation, some lab participation
- We would like to get DOE, NRC, and other non-nuclear regulatory endorsements that, "PSD-1 is an acceptable standard for developing an integrated, systems based, risk-informed, and performance-based design." We would like participation from the appropriate regulatory groups now to expedite the review and endorsement process.

Learn More and Participate

- Joining a ASME Code & Standards Committees
 - Participation on ASME's standards developing committees is free and open to technically qualified individuals with a willingness and ability to contribute.
 - You do not have to be a member of ASME to join a committee.
 - More information at: <https://www.asme.org/codes-standards/asme-code-committee>
- Attend a Standards Committee Meeting
 - Meetings are free to attend and open to the public,
 - Meeting schedules at: <https://www.asme.org/conferences-events/events?eventType=4>
- Catalog of Codes & Standards
- Find a Standard on searchable database: <https://www.asme.org/codes-standards/find-codes-standards>
- Board on Nuclear Codes and Strategic Committee on Nuclear Facilities
 - BNCS Meetings feature SMR reactors to provide insight and feedback on needs of reactors

Questions?

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