



## **10 CFR 50.55a Rulemaking**

Incorporation by Reference of American Society of  
Mechanical Engineers Codes and Code Cases

**March 2, 2016**



# Agenda

- |                    |  |
|--------------------|--|
| <b>1:00 – 1:10</b> | Opening Remarks and Introductions                                    |
| <b>1:10 – 1:20</b> | Documents approved for IBR (#1)                                      |
| <b>1:20 – 1:30</b> | Public Discussion of IBR'ed Documents (#1)                           |
| <b>1:30 – 1:40</b> | Appendix U (#2)  |
| <b>1:40 – 1:50</b> | Public Discussion of Appendix U (#2)                                 |
| <b>1:50 – 2:00</b> | Underwater Welding (#3)  |
| <b>2:00 – 2:10</b> | Public Discussion of Underwater<br>Welding (#3)                      |
| <b>2:10 – 2:20</b> | Steam Generator Preservice<br>Examinations (#4)                      |
| <b>2:20 – 2:30</b> | Public Discussion of Steam Generator<br>Preservice Examinations (#4) |
| <b>2:30 – 2:40</b> | Code Case N-824 (#5)   |
| <b>2:40 – 2:50</b> | Public Discussion Code Case N-824 (#5)                               |



# Agenda

- |                    |   |
|--------------------|---|
| <b>2:50 – 3:00</b> | Motor-Operated Valve (MOV) Testing (#6)                   |
| <b>3:00 – 3:10</b> | Public Discussion of MOV Testing (#6)                     |
| <b>3:10 – 3:20</b> | Break   |
| <b>3:20 – 3:30</b> | OM Condition: Check Valves (#7)                           |
| <b>3:30 – 3:40</b> | Public Discussion of Check Valves (#7)                    |
| <b>3:40 – 3:50</b> | OM Condition: Valve Position Indication (#8)              |
| <b>3:50 – 4:00</b> | Public Discussion of Valve Position Indication (#8)       |
| <b>4:00 – 4:10</b> | Inservice Testing Standards (#9)                          |
| <b>4:10 – 4:20</b> | Public Discussion of Inservice Testing Standards (#9)     |
| <b>4:20 – 4:30</b> | General Discussion on Public Comments and Closing Remarks |
| <b>4:30</b>        | Adjourn   |



# Meeting Purpose

- Discuss public comments on the NRC's proposed rule published in the *Federal Register* on September 18, 2015 (80 FR 56820) to amend 10 CFR 50.55a.
- Enhance NRC's understanding of the associated comments as the NRC continues to develop the draft final rule.
  - Comment period ended on December 2, 2015



## Meeting Purpose (cont'd)

- The NRC will consider the information developed at the meeting in developing the final rule.
  - The final rulemaking will not include formal comment responses to any oral comments made at this meeting.
- The NRC is not providing an additional opportunity to submit written public comments in connection with this meeting.



## **Incorporating New Versions of Section XI by Reference**

- The proposed § 50.55a(a)(1)(ii)(A) would incorporate the 2009 Addenda, 2011 Addenda, and 2013 Edition of ASME Code Section XI
- There would be several versions of ASME Code Section XI Appendix VIII in use by licensees, the 2001, 2007, 2007 with 2008 Addenda, and the 2013 editions
- Licensees can update to a later version of Appendix VIII via § 50.55a(g)(4)(iv)

Issue #1



# Public Comments

- Concerns have been raised over the complexity of maintaining several Appendix VIII programs for all licensees
- Two solutions were proposed
  - Allow licensees to use the latest version of Appendix VIII that has been incorporated by reference
  - Require licensees to use the latest version of Appendix VIII that has been incorporated by reference

Issue #1



## Allow or Require?

- This is a primarily a compliance/convenience issue
- Allowing licensees to update to the latest version of Appendix VIII (with the associated version of Appendix I) without a relief request would enhance safety, reduce paperwork, provide a path for licensees to coordinate ISI plans, and not impose a burden on licensees
- Forcing licensees to update their ISI plans with every rulemaking would face challenges in a backfit analysis

Issue #1



# Proposed Resolution of Comments

§ 50.55a(b)(2)(xv) may be revised to read:

Alternatively, licensees may elect to use Appendix VIII in the latest edition and addenda of the ASME Boiler and Pressure Vessel Code incorporated by reference in paragraph (a) of this section, subject to any applicable conditions listed in paragraph (b) of this section. Licensees shall use the same version of Appendix I as Appendix VIII including any applicable conditions listed in paragraph (b) of this section.

Issue #1



## **10 CFR 50.55a(a)(3)(ii) & (b)(2) – Nonmandatory Appendix U**

- In the proposed rule the NRC proposed to exclude Appendix U from the incorporation by reference (IBR) and not approve it for use.

Issue #2



## **Public Comments on Nonmandatory Appendix U**

- Public commenters believed the NRC should IBR Appendix U because it is the incorporation of ASME Code Cases N-513-3 and N-705 which are both approved in Regulatory Guide 1.147 (RG 1.147).

Issue #2



## **Proposed Resolution of Nonmandatory Appendix U Comments**

- NRC staff agrees that N-513-3 and N-705 are both approved in RG 1.147.
- In response to public comments, NRC staff is considering the following:

IBRing Appendix U into 10 CFR 50.55a with two conditions:

1. Repairs must be completed at next shutdown.
2. Leaks must not exceed 5 gpm.

Also would require use of Appendix from N-513-3 because it was omitted from Appendix U.

Issue #2



# Underwater Welding on Irradiated Materials

- The Code treatment of underwater welding on irradiated materials is inconsistent
  - ASME Code Article IWA-4660 (2010 Edition and later) prohibits underwater welding of irradiated materials other than P-8 materials with less than 0.1appm helium content
  - Article IWA-4660 (2006 Addendum through 2009 Addendum) prohibits underwater welding in applications exceeding  $10^{17}$  n/cm<sup>2</sup> thermal neutron fluence
  - Article IWA-4660 (Editions/Addenda earlier than 2006) does not prohibit underwater welding of irradiated materials

Issue #3



# Objective of Current Condition

- Current condition in 10 CFR 50.55a(b)(2)(xii) prohibits underwater welding on irradiated materials
- NRC proposed no change to this condition, which is more restrictive than Code allowances for welding on irradiated material
- Intent is that licensee must submit proposed alternative to NRC for approval, in accordance with 10 CFR 50.55a(z), for any underwater welding on irradiated material

Issue #3



# Public Comment

- Public comment (8-11) recommended condition be revised to apply only to Editions/Addenda earlier than 2010 Edition
  - Take advantage of allowances in later editions to permit underwater welding of some irradiated materials
- Public comment recognizes inconsistency between the current condition and recent Editions/Addenda of the Code
- Public comment does not address the inconsistencies
  - Between Code Editions/Addenda
  - Between various Code Cases

Issue #3



# Code Treatment of Welding on Irradiated Materials

- In various places criteria for determination of whether welding is prohibited is based on:
  - Predicted neutron fluence
  - Thermal neutron fluence
  - Measured or calculated helium content
  - “consideration” that shall be given to the effects of irradiation
- Thus there is inconsistency within the ASME Code regarding criteria for welding on irradiated materials, whether or not the welding is underwater

Issue #3



# Proposed Resolution of Scope Comments

- Include conditions in Proposed Rule which would consistently apply to all Code welding of irradiated materials, not just the underwater welding specified in IWA-4660
- Based on public comment NRC would permit welding without the need to submit proposed alternative in some cases:
- Condition 1 would apply to ferritic materials
  - Basis for threshold is fluence where observable change in toughness occurs due to irradiation of ferritic materials
- Condition 2 would apply to austenitic materials
  - Basis for threshold is consistent with industry criteria for BWR internals which has been evaluated by NRC staff

Issue #3



# Proposed Condition 1

- Licensees must obtain NRC approval in accordance with 10 CFR 50.55a(z) regarding the welding technique to be used prior to performing welding on ferritic material exposed to fast neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> (E > 1 MeV)

Issue #3



## Proposed Condition 2

- Licensees must obtain NRC approval in accordance with 10 CFR 50.55a(z) regarding the welding technique to be used prior to performing welding on austenitic material other than P-No. 8 material exposed to thermal neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> (E < 0.5 eV).

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Issue #3



## Proposed Condition 2 (continued)

- Licensees must obtain NRC approval in accordance with 10 CFR 50.55a(z) regarding the welding technique to be used prior to performing welding on P-No. 8 austenitic material exposed to thermal neutron fluence greater than  $1 \times 10^{17}$  n/cm<sup>2</sup> (E < 0.5 eV) and measured or calculated helium concentration of the material greater than 0.1 atomic parts per million.

Issue #3



## Steam Generator Tube Preservice Inspection in Proposed Rule 10 CFR 50.55a(b)(2)(xxx)

- NRC staff is clarifying the requirements for preservice inspection of steam generator tubes given the current requirement in IWB-2200(c) which indicates they are governed by the plant technical specifications.
- The NRC staff intended that the clarification be consistent with industry guidelines.
- Public comments received from the proposed rule language may not be consistent with current industry guidelines.
- There were also comments indicating that the timing of the examination, the objective of the examination, the acceptance criteria, and personnel qualifications be addressed in the rule.

Issue #4



# Steam Generator Tube Preservice Inspection – Resolution of Public Comments

- In light of the public comments, the NRC staff is considering the following approach for (b)(2)(xxx):

In lieu of the requirements of IWB-2200(c), a volumetric, full length preservice examination of 100% of the tubing in each steam generator shall be performed. The preservice examination shall be performed after tube installation for replacement steam generators or after field hydrostatic tests for a new plant, but in both cases, prior to initial power operation to provide a definitive baseline record against which future inservice examinations can be compared. Any tubes with flaws that exceed 40% of the nominal tube wall thickness shall be plugged. Any tubes with flaws that could potentially compromise tube integrity prior to the performance of the first inservice inspection, any tubes with indications that could affect future inspectability of the tube, and any tubes that do not meet design specifications shall also be plugged. The volumetric technique used for the examination shall be capable of detecting the types of preservice flaws that may be present in the tubes and shall permit comparisons to the results of the inservice examinations anticipated to be performed to satisfy the steam generator tube inspection requirements contained within the plant Technical Specifications. Qualifications for the personnel performing the examination shall be in accordance with IWA-2300 of Section XI of the ASME Boiler and Pressure Vessel Code for the methods, techniques, procedures, and equipment used during the preservice examination.

Issue #4



## Steam Generator Tube Preservice Inspection – Resolution of Public Comments (cont'd)

- One public comment was that a second preservice inspection should be required when a new or replacement steam generator has been potentially damaged during transportation, storage, rigging, or installation.
  - The NRC is not proposing to change the requirement to address this situation. The NRC believes that this situation is more appropriately addressed under 10 CFR 50, Appendix B, Criterion XVI since the scope of the second preservice inspection may depend on the potential damage that may have occurred

Issue #4



# ASME Code Case N-824

- ASME Code Case N-824 “Ultrasonic Examination of Cast Austenitic Piping Welds From the Outside Surface Section XI, Division 1” is listed as approved for use in § 50.55a(b)(2)(xxxvii)
- ASME Code Case N-824 describes the state-of-the-art methods for examining cast stainless steel components
- ASME Code Case recommends angles, frequencies, and aperture for ultrasonic transducers

Issue #5



# Public Comments

- Five conditions were imposed in the draft rulemaking in § 50.55a(b)(2)(xxxvii)(A)-(E)
- Comments were made requesting the removal or modification of all or some of the conditions

Issue #5



# Condition Requiring Encoding

- A condition requiring the use of encoding is described in § 50.55a(b)(2)(xxxvii)(A)
- Several public comments asked that this condition be removed
- NUREG/CR-6933 and NUREG/CR-7122 appear to show that encoding is required to discriminate flaws from material noise
- The NRC is considering keeping this condition in the final rule

Issue #5



## Condition Requiring Phased-Array

- The condition requiring the use of phased-array transducers is described in § 50.55a(b)(2)(xxxvii)(B)
- Several public comments asked that this condition be removed
- NUREG/CR-6933 and NUREG/CR-7122 appear to show that phased-array transducers are required
- The NRC is considering keeping this condition in the final rule

Issue #5



## Condition on Thin Components

- The condition restricting the frequencies used to inspect components 1.6 inches and less to 1 MHz and lower is described in § 50.55a(b)(2)(xxxvii)(C)
- Several public comments pointed out that NUREG/CR-7122 uses higher frequencies
- The NRC agrees with the public comments and is considering the removal of this condition

Issue #5



## Condition on Thick Components

- The condition requiring the use of 500kHz for thick components is described in § 50.55a(b)(2)(xxxvii)(D)
- While there was a general agreement that 500kHz was a good frequency, the lack of a tolerance meant that a 499 kHz transducer would not meet the proposed rule
- The NRC staff agree and are considering the addition of a +/- 20% tolerance to the final rule

Issue #5



# Condition Inspection Angles

- The condition requiring the use of angles from 30-70 degrees with a 5 degree increment be used for thick components is described in § 50.55a(b)(2)(xxxvii)(E)
- Public comments suggested that higher angles are of limited use
- The NRC agrees with the comments and is considering only requiring angles from 30-55 degrees with 5 degree increments
- Higher and lower angles would still be allowed as well.

Issue #5



## **10 CFR 50.55a(b)(3)(ii)(A) – MOV Diagnostic Test Interval**

- This condition in 10 CFR 50.55a(b)(3)(ii)(A) in the proposed rule states that licensees shall evaluate the adequacy of the diagnostic test interval for each MOV and adjust the interval as necessary, but not later than 5 years or three refueling outages (whichever is longer) from initial implementation of OM Code, Appendix III.

Issue #6.1



## **Public Comments on MOV Diagnostic Test Interval**

- Public commenters were concerned that the wording of the condition might limit the MOV periodic verification test intervals to 5 years or three refueling outages at the time of initial implementation of Appendix III.
- Public commenters indicated that most licensees had implemented Generic Letter 96-05 MOV periodic verification programs that have justified MOV test intervals beyond 5 years.

Issue #6.1



## **Proposed Resolution of MOV Test Interval Comments**

- NRC staff agrees that licensees may use current test information in evaluating the adequacy of MOV periodic verification intervals when initially implementing Appendix III.
- In response to public comments, NRC staff is considering the following approach for the condition:  
Licensees shall evaluate the adequacy of the diagnostic test intervals established for MOVs within the scope of OM Code, Appendix III, not later than 5 years or three refueling outages (whichever is longer) from initial implementation of OM Code, Appendix III.

Issue #6.1



## **10 CFR 50.55a(b)(3)(ii)(C) – MOV Risk Categorization**

- ASME OM Code Mandatory Appendix III allows licensees to apply risk insights if desired.
- When applying Mandatory Appendix III, licensees must use a risk categorization process that has been accepted by the NRC staff.

Issue #6.2



## Public Comments on Risk Categorization

- Public comments raised concerns that Appendix III is a two-category risk process although many licensees follow the Joint Owners Group (JOG) MOV test program, which is a three-risk category process for determining periodic test intervals for MOVs.
- Concern is that the two-category risk process is more restrictive when determining MOV test intervals per the JOG test matrix.
- Public commenters requested clarification of the condition.

Issue #6.2



## **Response to Risk Categorization Comments**

- Intent of condition is to indicate that when applying Appendix III, licensees may use either a two-category or three-category risk approach provided the method has been accepted by the NRC staff.
- Periodic MOV test intervals are set by licensee per Appendix III, Section III-6440, which permits but does not require the use of a risk method.
- Condition provided to require that method to assess risk for Section III-6440 must be accepted by NRC.
- JOG's three-category risk test interval program accepted by NRC and meets Section III-6440.

Issue #6.2



## **10 CFR 50.55a(b)(3)(ii)(D) – MOV Stroke Time**

- This condition in the proposed rule would require licensees, when applying Mandatory Appendix III, to verify that the stroke time of MOVs satisfies the assumptions in the plant safety analyses.
- This verification is to be completed during periodic valve exercising.

Issue #6.3



## **Public Comments on MOV Stroke Time**

- Public comments requested clarification if this requirement is applicable to all MOVs in the MOV test program.

Issue #6.3



## **Response to MOV Stroke Time Comments**

- Only those MOVs that have an isolation time limit to meet Technical Specifications (TS) design basis event assumptions will be required to have their stroke times verified during the valve exercise test in Appendix III.
- NRC staff will clarify that the condition requires that licensees verify that MOV stroke time limits referenced in plant TS are not exceeded when exercising the applicable MOVs.
- Condition does not require evaluation and tracking of MOV stroke-time data.

Issue #6.3



## **10 CFR 50.55a(b)(3)(iv) – OM Condition: Check Valves (Appendix II)**

- This condition in the proposed rule clarifies the maximum test interval allowed by Appendix II for individual check valves in a group of two or more.

Issue #7



## **Public Comments on OM Condition: Check Valves**

- Public comments raised concerns regarding the intent of clarifications for the implementation of Appendix II.
- Some public comments considered that the OM Code already addressed this issue.

Issue #7



## **Response to Comments on OM Condition: Check Valves**

- NRC staff agrees that ASME OM Code committees are addressing this issue via an ongoing update to the OM Code. It is expected to be part of the 2016 Edition.
- Review and incorporation by reference into 10 CFR 50.55a might not be completed until 2019.
- The purpose of this condition is to bridge the gap of time so that licensees that use Appendix II in their check valve programs are properly applying test intervals for valves in a group.

Issue #7



## **Response to Comments on OM Condition: Check Valves (cont'd)**

- When the new improved Appendix II is incorporated by reference in 10 CFR 50.55a, this condition will be removed.
- NRC staff will consider modifying the condition in the final rule to match clarifications planned for the upcoming 2016 Edition of the OM Code to provide a smooth transition to the updated Appendix II.

Issue #7



## **10 CFR 50.55a(b)(3)(xi) – OM Condition: Valve Position Indication**

- This condition in the proposed rule specifies that when implementing ASME OM Code, Subsection ISTC-3700, *Position Verification Testing*, licensees shall supplement the ASME OM Code provisions as necessary to verify that valve operation is accurately indicated.

Issue #8



## **Public Comments on OM Condition: Valve Position Indication**

- Licensees may need time to implement condition.
- Passive valves should be excluded from condition.
- Proposed condition is not a clarification but rather is a new requirement.
- Valve disc/stem separation events are rare and it will be a burden to test for them.
- Normal plant processes may provide some means of verifying disc/stem integrity, but using these processes in the IST program is a new requirement.

Issue #8



## **Response to Comments on OM Condition: Valve Position Indication**

- NRC staff is considering modifying condition to allow additional implementation time (such as applying to 2012 Edition of ASME OM Code).
- Passive valves require periodic verification of position indication. Therefore, condition should apply to both active and passive valves.
- Most valves have no provision for verifying obturator position by direct observation when implementing ISTC-3700. Therefore, supplemental methods must be used as indicated by OM Code.

Issue #8



## **Response to Comments on OM Condition: Valve Position Indication (cont'd)**

- Long standing ASME OM Code requirements of ISTC-3530 and ISTC-3700 for obturator movement verification are deterministic and general in nature. OM Code recognizes that valve stem-to-disc failures can occur and that assurances through testing are required to ensure that they are detected.
- ISTC-3550 recognizes that valves that operate during plant operation at a frequency that would satisfy OM Code exercising requirements need not be additionally exercised. Therefore, use of normal plant processes is not a new IST program requirement.

**Issue #8**



## **10 CFR 50.55a(f)(4) – IST Standards Requirement for Operating Plants**

- ASME OM Code specifies IST program requirements for pumps and valves that are required to perform a specific function in shutting down a reactor to the safe shutdown condition, in maintaining the safe shutdown condition, or in mitigating the consequences of an accident.
- Proposed rule in 10 CFR 50.55a(f)(4) aligned the IST program scope for pumps and valves with the ASME OM Code.
- Alignment consistent with definition of safety-related pumps and valves in NRC regulations.

Issue #9



## Public Comments on IST Program Scope

- Public comments indicated that pumps and valves within scope of ASME OM Code but not classified as Code Class 1, 2, or 3 are addressed through augmented IST programs designed to meet the ASME OM Code where practicable.
- Public comments raised concerns regarding potential paperwork burden of IST scope alignment for pumps and valves in 10 CFR 50.55a(f)(4) and ASME OM Code, based on submittal of relief or alternative requests for ASME OM Code pumps and valves not classified as Code Class 1, 2, or 3.

Issue #9

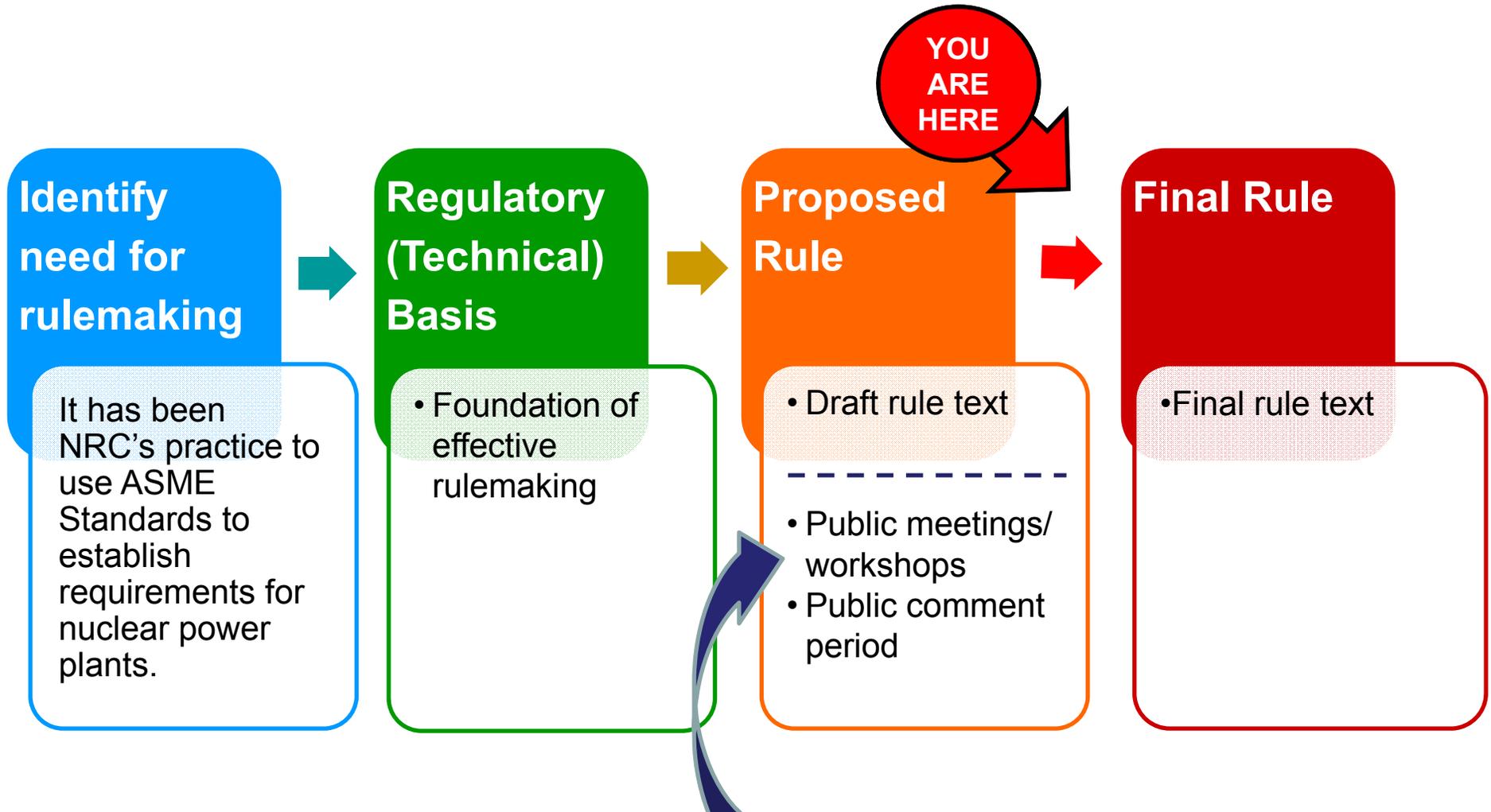


## Proposed Resolution of IST Scope Comments

- As allowed by 10 CFR 50.55a(f)(6)(ii), NRC staff agrees that implementation of an augmented IST program would be adequate for safety-related pumps and valves not classified as Code Class 1, 2, and 3.
- Staff considering an approach in (f)(4) that IST requirements for pumps and valves that are within the scope of ASME OM Code but are not classified as ASME Code Class 1, 2, or 3 may be satisfied as an augmented IST program in accordance with (f)(6)(ii) without requesting relief under (f)(6)(i) or alternatives under (z) of 10 CFR 50.55a.

Issue #9

# Rulemaking Timeline



**Opportunities for public participation**



# Next Steps

- NRC staff develops draft final rule package
- NRC management review of draft approval
- Publish final rule in the *Federal Register*

# For more information



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# How did we do?

- Link to Public Meeting Feedback form:





# Acronyms

|      |  |
|------|--|
| ASME | American Society of Mechanical Engineers |
| CFR  | <i>Code of Federal Regulations</i>       |
| FR   | <i>Federal Register</i>                  |
| IBR  | Incorporation by Reference               |
| ISI  | Inservice Inspection                     |
| IST  | Inservice Testing                        |
| JOG  | Joint Owners Group                       |
| MOV  | Motor-Operated Valve                     |
| NRC  | Nuclear Regulatory Commission            |
| OM   | Operation and Maintenance                |
| RG   | Regulatory Guide                         |
| TS   | Technical Specifications                 |