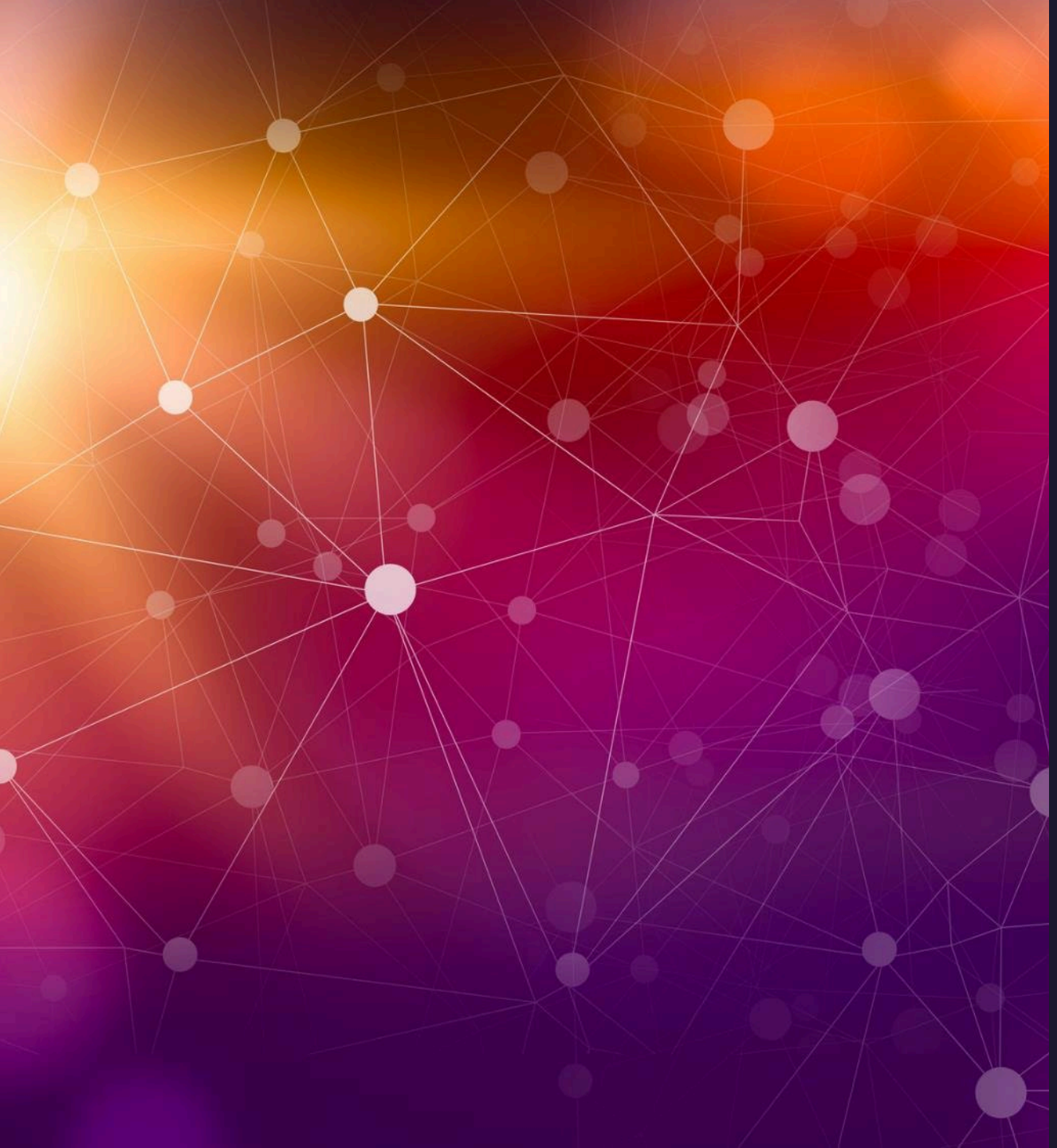


IST Program Development & Implementation

Betsy Moenkedick – SNC
Mark Gowin – TVA
July 2025

Southern Nuclear

TVA TENNESSEE VALLEY AUTHORITY

Disclaimer

- The views expressed in this presentation do not necessarily reflect the views or policies of the Tennessee Valley Authority or Southern Nuclear Company. The views in this this presentation are based on the authors' personal experiences in performing IST Program interval updates.

Agenda

- Introduction on Guide
- 10CFR50.55a Update Requirement
- Preparing for IST Interval Update
- IST Program Revision
- IST Program Implementation
- IST Program Submittal

Introduction of Guide – Why is this important?

- IST Update - AOV & MOV under ASME OM Code
- Owners (unfamiliar)
- It's the law

Overview

10CFR50.55a(f)

- Mandates Licensees to implement an IST Program in accordance with the ASME OM Code
- Imposes additional requirements
- Provides method to deviate from OM Code

ASME OM Code

- Define scope, test requirements, and test frequency

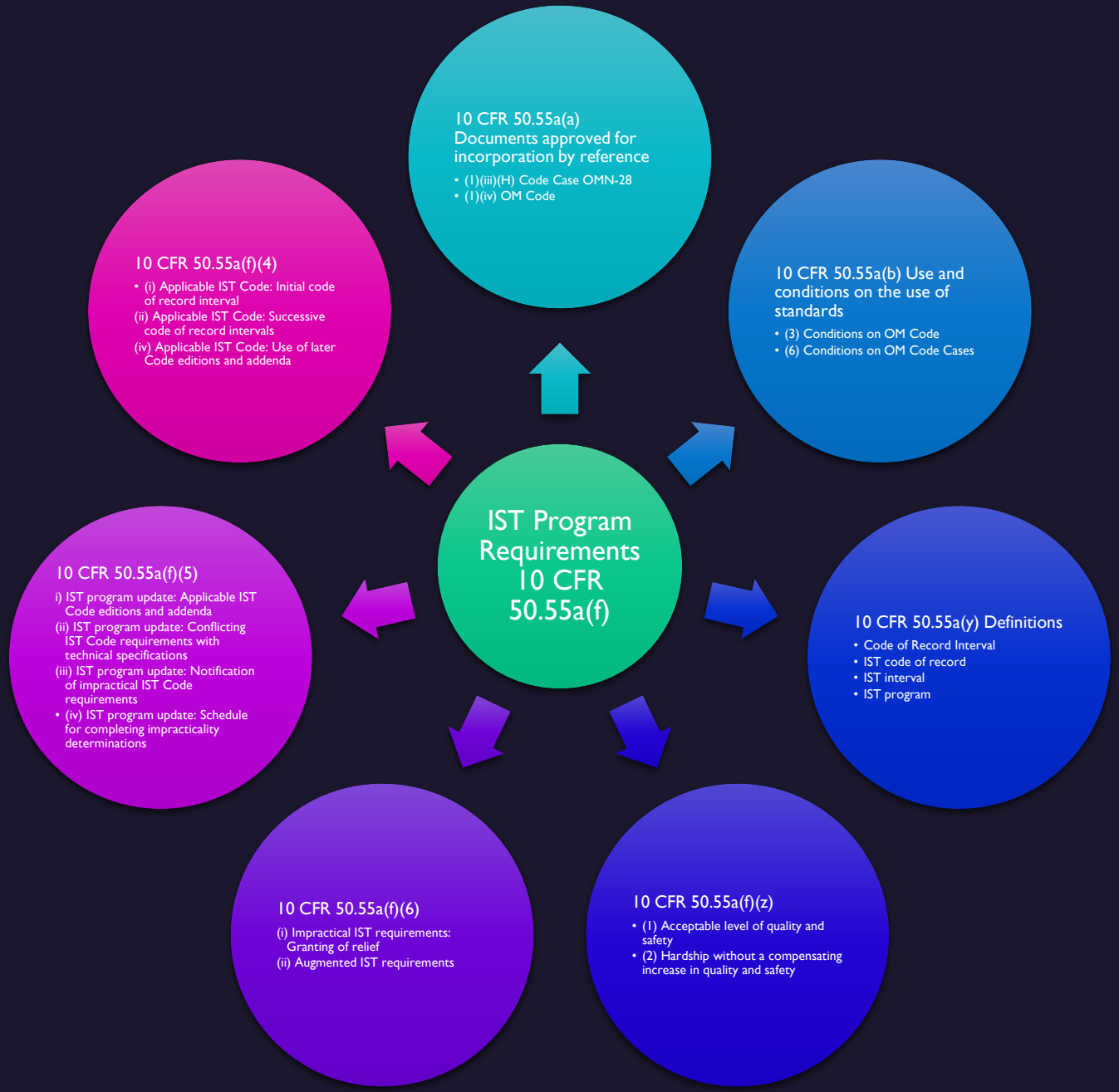
Code Cases

- Optional alternative to specific OM Code requirements
- Endorsed for use in RG 1.192

10CFR50.55a – Where Inservice Testing (IST) starts

eCFR :: 10 CFR 50.55a -- Codes and standards.

10 CFR 50.55a Overview



10CFR50.55a Codes and Standards

- 10CFR50.55a(a) – Documents approved for incorporation by reference
  - Code Case OMN-28 ((a)(1)(iii)(H)) and ASME OM Code ((a)(1)(iv))
- 10CFR50.55a(b) – Use and conditions on the use of standards
  - Conditions on the ASME OM Code ((b)(3)) and Code Cases ((b)6))
- 10CFR50.55a(f) Preservice & Inservice testing standards requirement for operating plants
  - 10CFR50.55a(f)(4) – states the applicable IST Code for initial code of record interval and subsequent code of record intervals
  - 10CFR50.55a(f)(5) – Requires licensees to update their IST Program to the latest edition of OM code endorsed by NRC within 18 months of the start of their interval
  - 10CFR50.55a(f)(6) – Requirements for updating the IST Program
    - Granting of relief & Augmented requirements
  - 10CFR50.55a(f)(7) – Inservice testing reporting requirements

10CFR50.55a Codes and Standards

- 10CFR50.55a(y) – Definitions
  - Code of record interval
  - Inservice examination & test IST code of record
  - Inservice examination & test IST interval
  - Inservice examination & test IST program
- 10CFR50.55a(z) – Use and conditions on the use of standards
  - Acceptable level of quality and safety
  - Hardship without a compensating increase in quality and safety
- IST program update: Conflicting IST Code requirements with technical specifications
  - If a revised IST program conflicts with Tech Specs, then Tech Specs need to be revised six (6) months before the start of the interval where provisions become applicable

Preparing for the IST Program Interval Update

IST Interval Update Preparations

- ✓ T-3 years (or earlier)
  - Determine Scope, cost estimate, project manager, vendor support, team members, schedule, and obtain funding
- ✓ T-2 years
  - Develop IST Program (comply with 10 CFR 50.55a), verify credited design limits available, and develop relief or alternative requests for NRC submittal
- ✓ T-1 year
  - Revise IST documents and procedures & revise/create new PM tasks
- ✓ T-0 year
  - Verify IST Program components have procedure/PM/document for implementation
- ✓ T-0 to T+90 days
  - Submit IST Program to the NRC

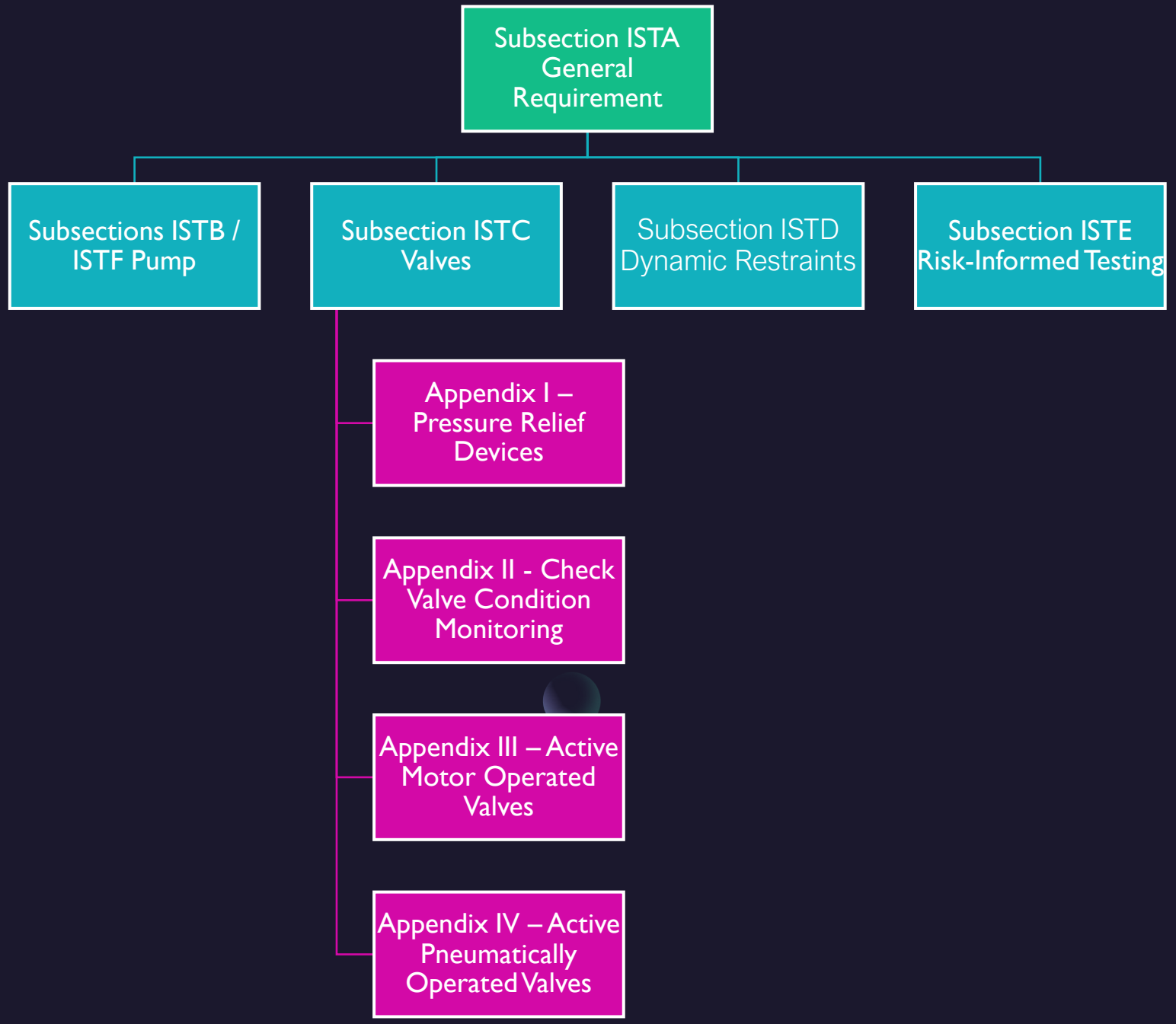
IST Interval Update Preparations Cont.

- ✓ Determine Code Edition for next Code of Record Interval
  - Must comply with latest edition of OM Code incorporated by reference in 10CFR50.55a(1)(1)(iv) no more than 18 months before start of interval (NRC Liaison report)
  - ISTA-3120(c) allows interval extension (or decreased) by 1 year
  - ISTA-3120(d) allows extension when unit out of service continuously for 6 months or more
- ✓ Useful information for Code of Record Interval
  - Current IST Program document should list dates of past & current intervals
  - NRC Regulatory Issue Summary (RIS) 2004-12 provides a method to use a later edition of the OM Code

IST Interval Update Preparations Cont.

- Determine Scope of Next Interval IST Program
  - Dynamic Restraints (Snubbers)
    - Determine if snubbers should be included in IST or as a separate Snubber Program
  - Motor Operated Valve (MOV) Program
    - Appendix III (active MOVs) instead of GL 89-10
    - Active/passive categorization may differ
    - PRA risk ranking of MOVs – align test frequency with component plant risk
  - Pneumatically (Air) Operated Valves (AOV) Program
    - Appendix IV (active AOVs) instead of the Joint Owners Group (JOG) Program
    - New Performance Assessment Test (PAT) requirement (address functional margin)
  - Impact to the IST Program implementing procedures
    - Program changes only or update all for consistency, usability, and reviews

ASME OM Code Structure



IST Interval Update Preparations Cont.

- Determine differences in test requirements between current & next interval
  - Line by line comparison between Codes & NRC Conditions (vendor often provides)
  - Major Changes
    - New Pump Periodic Verification Testing (PPVT)
      - Test at credited safety analysis flow and differential or discharge pressure (speed, instrument accuracy assumptions, and diesel generator frequency variation assumptions need to be understood)
    - Appendix III – Active MOVs
      - New requirement to monitor component functional margin for diagnostic test frequency
      - Replaces parts of ISTC – stroke timing only if required by Technical Specifications, other full cycle exercise testing (pass/fail)
      - Additional Calculations may be required (if MOV program does NOT comply with OMN-1)
      - Address deltas – ex. Plug/diaphragm valves were exempted from 89-10/96-05 and need to meet App III
      - ISTC-3700 requirements relocated to Appendix III (may require procedure revisions)

IST Interval Update Preparations Cont.

- Major Changes Continued……
  - Appendix IV – Active AOVs
    - New PAT may be limited to high risk AOVs
    - Additional calculations may be required (if no calcs for Cat 2 valves) or modifications to the plant needed
    - ISTC requirements moved to Appendix IV in the 2020 and 2022 Editions of OM Code
  - Supplemental Valve Position Indication
    - Required by NRC Condition in 10CFR50.55a(b)(3)(xi)
    - Requires verification of valve obturator position using observations (change in flow, pressure, etc.)
    - Same frequency as ISTC-3700, position verification testing (2-year)
    - Significant burden in time and cost to implement (may require new procedures or request for alternative)

Revise the IST Program to comply with new OM Code Edition

Develop a Strategy

- Determine whether a re-review of IST Program scope is warranted
  - ✓ After this interval update, the next interval update will not be required for another 20-25 years
  - ✓ Opportunity to incorporate industry lessons learned since last interval update
  - ✓ Licensing requirements
- Determine how to manage IST Program changes
  - ✓ Recommend maintaining current IST Program document as normal to meet current code of record requirements
  - ✓ Recommend drafting a separate next interval IST Program document with all changes due to next interval code of record
  - ✓ Transition to next interval IST Program as start of next interval

Criteria for determining OM requirements

- Determined by a review of the site's current licensing basis (CLB)
  - ✓ Design requirements
  - ✓ Safety Analysis
  - ✓ Licensing requirements
- Distinction between component functions that are credited in the CLB versus those that are a capability
  - ✓ Only CREDITED function are applicable for OM Code Scope and component categorization
- ASME OM Code is a component code clarified by:
  - ✓ ISTA-1200, Jurisdiction
  - ✓ ISTA-1310, Component Subject to Testing and Examination

Program Scope

- NOT limited to ASME Code Class 1, 2, or 3 components

a) Pumps and valves that are credited 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

b) Pressure relief devices that protect systems or portions of systems that perform one or more of the three functions identified in (a)

c) Dynamic restraints (snubbers) used in systems that perform one or more of the three functions identified in (a), or to ensure the integrity of the reactor coolant pressure boundary

Note: the above scope statement is essentially the same definition of "safety related" in 10CFR50.2

Component Attributes

- Pumps
  - ✓ Determine if pump has specific design basis accident flow rate credited in safety analysis (PPVT)
  - ✓ ASME Code Class
  - ✓ Group A or Group B
  - ✓ Pump Type (centrifugal, vertical line-shaft, or positive displacement)
  - ✓ Fixed or variable speed
- Valves
  - ✓ ASME Code Class
  - ✓ Valve Category
  - ✓ Active or Passive
  - ✓ Actuator type
  - ✓ PRA Risk ranking
  - ✓ Valve positions (normal, fail-safe, & safety-related position(s))
  - ✓ Remote Position Indication
  - ✓ Functions (CIV/PIV/Appendix J)
  - ✓ Check Valves – Check Valve Condition Monitoring Program

Component Attributes Cont.

- Rupture Discs
  - ✓ ASME Code Class
  - ✓ Component type (rupture disk)
- Snubbers
  - ✓ ASME Code Class
  - ✓ Component type (mechanical / hydraulic)
  - ✓ Manufacturer and Model
  - ✓ Assigned Defined Test Plan Groups (DTPGs)
  - ✓ Sample Plan assignment (10% or 37 Plan)
  - ✓ Accessibility (accessible for visual examination)

Assign test requirements

- Determine component test requirements based on categorization and design characteristics (ex. Remote position indication)
  - ✓ Pumps – Table ISTB-3000-1 (parameters) & Table ISTB-3400-1 (frequency)
  - ✓ Valves – Table ISTC-3500-1 (requirements by type & category)
    - Frequency in Tables ISTC-3510, ISTC-3540, ISTC-3600, ISTC-3700, & ISTC-5260
    - Test Type & Frequency in Appendix I (Pressure Relief Devices), Appendix II (CVCM), Appendix III (MOVs), and Appendix IV (AOVs)
  - ✓ Snubbers
    - Visual examination requirements & frequency in ISTD-4200
    - Operational readiness (Bench testing) requirements in ISTD-5200
    - Service life monitoring requirements in ISTD-6000
  - ✓ General
    - NRC Conditions (Supplemental position indication)
    - OM Code Cases, Relief requests, and alternatives
    - Deferred test justifications (Cold Shutdown or Refueling Outage)

Put it ALL together

- Draft front matter of IST Program Plan (owner information, interval dates, code of record, code cases used, etc.)
- Compile component test tables (pump & valve attributes, test requirements, & implementing procedure)
- Compile list of relief requests or alternatives – reference the associated component
- Compile list of deferred test justifications – reference the associated component
- Compile list of IST positions or clarifications
- ALL of the above goes into the IST Program plan

Revise implementing procedures, PMs, & Documents

- Tricky process – ensure current compliance when revising for new interval
- Work with procedure owners (Ops & Maintenance) on revisions (IST Engineer may need to provide markup)
- Develop a method to track procedure changes required
- Determine a priority & schedule for implementing procedure revisions
- Develop a method to track IST Program document component implementing procedure changes
- Initiate new PMs or revise current PMs
- Complete the new IST Program Plan document

Submit IST Program document to NRC

- IST Program document is required to be submitted to the NRC within 90 days of starting the new interval
- 10CFR50.55a(f)(7) states:

"Inservice Testing Program Test and Examination Plans (IST Plans) for pumps, valves, and dynamic restraints (snubbers) prepared to meet the requirements of the ASME OM Code must be submitted to the NRC as specified in § 50.4. IST Plans must be submitted within 90 days of their implementation for the applicable inservice examination and test interval. Electronic submission is preferred."

- This regulatory requirement is easy to overlook – recommend tracking this in the interval update schedule

Recap

- Code of Record (10CFR50.55a)
- Plan ahead & coordinate with existing programs
- Determine Program Scope (system reviews / CLB)
- Determine attributes, requirements, & test frequency
- Revise procedures & PMs then submit IST program document to NRC

Questions?

Thank you!