



U.S.NRC

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Protecting People and the Environment

Air-Operated Valve Regulatory Activities

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Disclaimer

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Example NRC Regulations applicable to Air-Operated Valves (AOVs)

- 10 CFR 50.49 – Environmental Qualification
- 10 CFR 50.55a – Codes and Standards (Inservice Testing)
- 10 CFR 50.65 – Maintenance Rule
- 10 CFR 50.69 – Risk-Informed Treatment
- 10 CFR Part 50, Appendix A – General Design Criteria
- 10 CFR Part 50, Appendix B – Quality Assurance
- 10 CFR Part 50, Appendix S – Earthquake Engineering Criteria (Seismic)

NRC Regulatory Activities applicable to AOVs

- Current 10 CFR 50.55a Regulatory Requirements
- ASME OM Code, 2020 Edition, 10 CFR 50.55a Rulemaking
- ASME OM Code Case Rulemaking including Regulatory Guide (RG) 1.192 update
- Power-Operated Valve (POV) Inspections
- Dresser Vendor Inspection

Current 10 CFR 50.55a Regulatory Requirements

- Incorporates by reference 2017 Edition of ASME OM Code with conditions.
- 2017 Edition of ASME OM Code includes Mandatory Appendix IV, “Preservice and Inservice Testing of Active Pneumatically Operated Valve Assemblies in Nuclear Reactor Power Plants”
- 10 CFR 50.55a(b)(3)(xi), *OM condition: Valve Position Indication*, supplements ISTC-3700 to require licensees to verify that valve operation is accurately indicated by supplementing valve position indicating lights with other indications.

ASME OM Code, Appendix IV

- Quarterly stroke-time testing required for all AOVs in IST program
- Preservice performance assessment testing (PAT) required using diagnostics for all AOVs
- Periodic PAT using diagnostics required for AOVs classified as high safety significant components (HSSCs) with an interval based on capability margin up to a 10-year maximum interval.

Items of Interest in ASME OM Code, 2020 Edition, Proposed Rulemaking

- Includes NRC Inservice Testing (IST) Plan submittal requirements with deletion from 2020 Edition
- Streamlines references to ASME OM Code editions to simplify future 10 CFR 50.55a rulemaking, and to update specific conditions to reflect the latest ASME OM Code editions.
- Incorporates Subsection ISTE for risk-informed IST programs in 2020 Edition of ASME OM Code without conditions
- Proposes modification of ISTC-3700 testing interval for valves not susceptible to stem-disk separation

10 CFR 50.55a Regulations for ASME OM Code Cases

- 10 CFR 50.55a currently incorporates by reference Revision 4 to RG 1.192
- RG 1.192, Revision 4, lists OM Code Cases that are acceptable with or without conditions
- RG 1.192, Revision 4, accepts new ASME OM Code Cases OMN-22 through OMN-27 without conditions.

Next 55.55a Code Case Rulemaking (Revision 40)

- NRC staff is preparing proposed 10 CFR 50.55a rule to incorporate by reference RG 1.192, Revision 5, that would accept ASME OM Code Cases OMN-28 through OMN-30 without conditions, and OMN-31 with conditions
- NRC staff is also preparing the proposed rule to extend the IST Code of Record update requirement from 10 years to 20 or 24 years for licensees that have updated their IST programs to at least the 2020 Edition of the ASME OM Code as incorporated by reference in 10 CFR 50.55a
- NRC staff plans to issue the proposed rule for public comment in early 2023

POV Inspection Program

- Inspection Procedure (IP) 71111.21N.02, Design-Basis Capability of Power-Operated Valves [POVs] Under 10 CFR 50.55a Requirements, updated on October 9, 2020.
- Inspection objective is to assess reliability, functional capability, and design basis of risk-important POVs as required by 10 CFR 50.55a and 10 CFR Part 50, Appendix A and Appendix B.
- NRC Regions are implementing the POV Inspection Program with technical assistance from HQ staff.
- NRC Information Notice 2021-01 (May 6, 2021) discusses lessons learned from initial POV inspections.

POV Inspection Status

- POV inspections using IP 71111.21N.02 have been performed at over 60 nuclear power plant units since January 2020.
- Inspections focus on a sample of 8 to 12 POVs including:
 - Motor-Operated Valves (MOVs)
 - Air-Operated Valves (AOVs)
 - Hydraulic-Operated Valves (HOVs)
 - Solenoid-Operated Valves (SOVs)
 - Pyrotechnic-Operated (Squib) Valves
- Many inspections rely on partial remote means due to COVID-19.

POV Inspection Results

- POV inspections have identified several Green Non-Cited Violations (NCVs) and numerous minor and licensee identified violations.
- At a virtual public meeting on December 8, 2020, NRC staff discussed lessons learned from the POV inspections up to that time.
- NRC staff discussed more recent POV inspection lessons learned at a public meeting with the Boiling Water Reactor Owners Group (BWROG) on December 1, 2021 (ADAMS Accession No. ML21334A168).

Additional POV Inspection Lessons since IN 2021-01

- A. Evaluation of possible consequences of drilling a hole in valve disk when preventing pressure locking
- B. JOG program schedule does not include grace periods so commitment change process needed
- C. Monitoring torque limits when operating a valve by its manual handwheel
- D. Ensuring leak rate requirements met for MOVs with long closing torque switch bypass
- E. Improper reliance on one-time stall torque limits for actuator margin calculations
- F. Determination of stem lube degradation factor for ball-screw stem nut

Additional POV Inspection Lessons (continued)

- G. Identification and correction of degraded magnesium MOV motor rotors
- H. Consideration of gate valve unwedging force
- I. Modification of JOG program schedule commitments
- J. 10 CFR 50.59 evaluations for valve pressure locking modifications
- K. Evaluation of MOVs with design-basis safety functions to throttle flow
- L. Potential for improper stroke time calculations that rely on computer data
- M. Updating POV surveillance program following PRA update

Additional POV Inspection Lessons (continued)

- N. Response to EPRI MOV PPM Type 1 warnings
- O. Verification that installed POVs match calculation assumptions
- P. Maintaining EPRI MOV PPM long-term applicability
- Q. Monitoring of industry data for valves that EPRI MOV PPM is best available information
- R. Verification and Validation of POV software
- S. Removal of valves from 10 CFR Part 50, Appendix J Program without adequate technical justification

Dresser Vendor Inspection

- NRC staff conducted a limited scope inspection at the Dresser facility in Jacksonville, FL, from May 9 to 13, 2022 (ADAMS No. ML22172A160)
- Dresser supplies safety-related Consolidated and Masoneilan pressure relief valves, control valves, and parts
- Inspection focused on quality activities associated with the design fabrication, and testing of valves and valve replacements parts for U.S. nuclear power plants
- There were no inspection findings of safety significance
- In response to NRC inspection discussions, Dresser initiated Corrective Action Reports to provide improvements to test procedures and design report verification

Conclusion

- Licensees should review current 10 CFR 50.55a and ongoing rulemakings with respect to AOV testing activities.
- NRC staff is continuing its POV Inspection Program and plans to develop a summary of the overall lessons learned when the POV Inspection Program is completed at the end of 2022.
- Although the NRC vendor inspection at Dresser in May 2022 did not identify any safety significant issues, Dresser is implementing procedure improvements in response to the inspection discussions.

QUESTIONS?