

Vogle PEmails

From: Hoellman, Jordan
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To: Vogle PEmails
Cc: Patel, Chandu; Gleaves, Bill
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VOGTLE UNITS 3&4



Preservice Inspection of Specific Piping to Valve Welds

NUCLEAR DEVELOPMENT

Meeting Objective and Agenda


Meeting Objective

- Inform the NRC of the proposed alternative for preservice volumetric inspection of specific valve to piping welds
- Receive and address Staff feedback

Agenda

- Background
- Proposed alternative
- Schedule
- Conclusion

VOGTLE
UNITS 3&4

 Georgia Power

 Southern Nuclear

 Westinghouse

FLUOR

NUCLEAR DEVELOPMENT

Background

- At a meeting with the staff on June 9th, 2016, Westinghouse presented inspectability issues with performance of specific examinations
 - Remaining items and extent of condition will be discussed in a following presentation
- A proposed solution path was discussed and feedback provided
- VEGP 3&4 is preparing to submit an alternative to the requirements of ASME Section XI for specific valve to piping welds
- Actions have been initiated within ASME Section XI to address the industry issue for future plants

Background: Requirements

- 10 CFR 50.55a(g)(3)(i) and (ii) provides the inservice inspection (ISI) program design and accessibility requirements for Class 1, 2, and 3 components and supports as follows:
 - *Components (including supports) that are classified as ASME Code Class 1, 2, and 3 must be designed and be provided with access to enable the performance of inservice examination of these components and must meet the preservice examination requirements set forth in the applicable editions and addenda of Section III or Section XI of the ASME BPV Code*
- ASME BPV Code Section XI requires all Class 1, 2, and 3 welds to be examined via nondestructive examination (NDE). The scope of these examinations is defined as the preservice and inservice inspection program. The preservice inspection (PSI) serves as the baseline examination for the inservice inspection (ISI) program (throughout the life of the plant).
- The AP1000 UFSAR (Section 5.2.4.2) requires both PSI and ISI programs to be developed in accordance with 10 CFR 50.55a(g) and ASME BPV Code Section XI requirements:
 - *The components and welds requiring Inservice inspection are designed to allow for the application of the required Inservice inspection methods, that is, sufficient clearance for personnel and equipment, maximized examination surface distances, two-sided access, favorable materials, weld joint simplicity, elimination of geometrical interferences, and proper weld surface preparations.*

Background: ASME Section XI Requirements

- Performance demonstration of equipment, procedures, and personnel in compliance with Section XI Appendix VIII Supplement 2 (Wrought Austenitic Stainless Steel Piping Welds) and Supplement 3 (Ferritic Piping Welds)
 - PDI-UT-2 Qualified Procedure for Wrought Austenitic SS Piping Welds
 - Where dual-sided access is not possible, single-sided examinations are not qualified for full coverage. However, supplemental examination of the far side is required.
 - PDI-UT-1 Qualified Procedure for Wrought Ferritic Piping Welds
 - Where dual-sided access is not possible, single-sided examinations are qualified to demonstrate full coverage.
- For ferritic welds single sided examination of welds is allowed for coverage credit. Not applicable to stainless steel.

Background: Section III Design Requirements

- AP1000 valve designs meet the requirements of ASME B16.34 and ASME Section III NB/NC-4000 for minimum wall thickness (t_M)
- A flat end weld transition would allow for better inspectability, however, the ASME boundary (i.e., t_M) and pipe nozzle loading would not be met

Background: Problem Statement

- Section III requirements are met for the subject piping to valve welds but cannot be inspected as required by Section XI

Proposed Alternative Scope

- Addresses 2 categories for valve to piping weld preservice inspections
 - Cast austenitic steel valve bodies to wrought austenitic pipes (52 valves with 85 welds)
 - Wrought valve bodies to wrought austenitic pipes (6 valves with 8 welds)

Proposed Alternative Inspection

- Implement a similar approach for the examination volume on the valve side of the weld that has been adopted in the ASME Code Section XI for Examination Category B-M-2: Valve Bodies;
 - The valve material is excluded from volumetric examination .

Proposed Alternative Inspection

- For the valve side of the weld, best effort outer diameter surface ultrasonic examinations of the valve side examination volume using ultrasonic test techniques from the pipe side of the weld, on the conditioned weld surface and where practical from the valve side of the weld will be performed.
- For the pipe side of the weld, the mandatory preservice ASME Code Section XI, Appendix VIII ultrasonic examinations of the pipe side of the valve-to-pipe examination volume will also be performed with examination coverage of essentially 100% (pipe side only).

Proposed Alternative Technical Basis

- Code Case N-481
 - This code case eliminated the volumetric examination requirements for cast austenitic pump casings and replaced with a visual examination
- Code Case N-481 Technical Basis
 - Cast stainless steel is highly resistant to corrosion
 - Cast stainless has low stresses due to cast design
 - Cast stainless operating experience
 - Initially required a flaw evaluation, but was later removed due to successful review of many
- Incorporation into ASME Section XI
 - Code Case was incorporated into ASME Section XI in 2000 with the removed requirement for a flaw evaluation and was expanded to cast valve bodies in 2008

Proposed Alternative Technical Basis

- Code Case N-770-1
 - Code Case was originally established to increase inspect requirements for Alloy 600 and its associated weld metals
 - *As part of the technical basis for establishing inspection requirements (Section 3.2 Ultrasonic Testing) – “For cast stainless steel items for which no supplement is available in Appendix VIII, the examination volume shall be examined by Appendix VIII procedures to the maximum extent practicable... If 100% coverage of the required volume for axial and circumferential flaws cannot be met, 100% coverage for circumferential flaws (of the susceptible material) is to be met. This is the practical solution for the examination of the weld and buttering of the susceptible material when the base metal is cast stainless steel, or otherwise not completely inspectable. The examination coverage requirements will then be considered to be met.”*
 - *This further confirms the treatment of cast stainless steel materials which started with the original acceptance of Code Case N-481.*

Schedule

- Submit Alternative – November 3, 2016
- Process a Non-LAR departure to incorporate Alternative Request into Licensing Basis after approval is received.

Conclusion

- The issue of UT examination limitations for stainless steel, and their implementation into ASME Code requirements, has been recognized for many years.
- Stainless steel in general, and cast stainless steel in particular is highly resistant to corrosion, and has very high fracture toughness, which counteracts the concern about inspectability.
- The proposed alternative request maps the technical justifications used for similar valve/pump welds (Code Case N-481) to the current configuration on the AP1000 plants.