Industry Comments on GALL-SLR Supplement Mechanical Topics

SRP-SLR Table 3.1-1 Line 38
RCP Flow Tolerance

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SRP-SLR Table 3.1-1, Line 38

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Technical Basis

Two major technical changes are proposed to AMP XI.M12 for SLR. First, the staff decided to modify the AMP to remove language that excludes pump casings from the additional aging management recommendations of XI.M12. The basis for this change is that formerly ASME Code Case N-481 specified additional examination and flaw tolerance requirements for pump casings as an alternative to the volumetric examinations required by the ASME Code, Section XI. However, Code Case N-481 has been withdrawn and some, but not all of the provisions of the code case were incorporated into more recent editions of section XI. Therefore, the staff decided that pump casings should be subject to the recommendations of the AMP including screening for thermal embrittlement and other actions such as enhanced inspections or component-specific flaw evaluations if the screening criteria are not met.

Background

- Code Case N-481, for pump casings
  - Accepted as a Code Case by ASME (March 1990)
  - Accepted by NRC in RG 1.147, Rev. 9 (April 1992)
- Code incorporation of N-481, into Table IWB-2500
  - 2000 Addenda of Section XI (Action BC-00-028)
  - 2000 Addenda endorsed by NRC September 2002

Technical Resolution: Code Case N-481

- Code Case N-481:
- Volumetric examinations of cast stainless steel replaced with a visual examination for pump casing welds, only when the pump was disassembled
- The Code Case included a flaw tolerance evaluation requirement
- Code Case has been accepted by the NRC Staff and incorporated into the ASME BPV Code

Technical Resolution: Code Implementation of Code Case N-481

- In the 2000 Addendum, N-481 was included in the body of Section XI, in Table IWB-2500-1
- As part of this action, two changes were made to the original requirements of N-481:
  - The Flaw Tolerance evaluation required by the Code Case was removed, because multiple successful calculations had been done to demonstrate the flaw tolerance of these components
  - Valve bodies were added, because they were designed in a similar fashion, and had likewise been trouble-free

Technical Resolution: Code Implementation of N-481 (2008A)

Code Revisions
XI-1-A08 (05-1226)
IWB-2411(a)(3), IWB-2500(b), Table IWB-2500-1 + Notes 2 & 4, Fig. IWB-2500-16, Fig. IWB-2500-17, Table IWB-3410-1, IWB-3516.2(a), IWB-3518, IWC-2500(b), Table IWC-2500-1, Fig. IWC-2500-8, Table IWC-3410-1, IWC-3515
Pump Casing and Valve Body Welds, Category B-L-1, Category B-M-1, Category C-G
TECHNICAL
SIGNIFICANT
This revision deletes the examination requirements for Pump Casing and Valve Body Welds, Categories B-L-1, B-M-1, and C-G, because experience has not identified any failures in pump casing or valve body welds. Further, risk informed evaluations have not identified any degradation mechanism specifically associated with these welds. However, the requirement for performing these examinations results in unnecessary radiation exposure for NDE personnel. Any degradation of the pump or valve interior will be detected by the Category B-L-2 and B-M-2 VT-1 examinations or by the mechanic working on the component internals, and through wall leakage will be detected by the VT-2 examinations during system pressure tests.

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Industry Perspective on NRC Position on SRP-SLR Table 3.1-1, Line 38

- It appears that the NRC Staff decided that because Code Case N-481 has been withdrawn and some, but not all of the provisions of the code case were incorporated into more recent editions of Section XI, pump casings should be subject to recommendations of the AMP including:
  - Screening for thermal embrittlement, and
  - Other actions such as qualified and enhanced inspections, or
  - Component-specific flaw evaluations if the screen criteria are not met
- Each of these three recommendations are discussed in the next few slides

Industry Response on NRC Position on SRP-SLR Table 3.1-1, Line 38

- (NRC Recommendation) Pump casings should be subject to recommendations of the AMP including screening for thermal embrittlement,
- Industry Response
  - Per May 19, 2000 Grimes letter, thermal aging not susceptible (Table 2, low Mo, Low ferrite, static)
  - Screening for susceptibility to thermal aging is not required and the current ASME Code inspection requirements are sufficient
  - Screening not required per NUREG-1801 XI.M12

Industry Response on NRC Position on SRP-SLR Table 3.1-1, Line 38

- (NRC Recommendation) Pump casings should be subject to recommendations of the AMP including other actions such as enhanced inspections,
- Industry Response
  - Code Case N-481 was based upon VT-1, VT-2, and VT-3 examinations
  - Section XI, IWB-2500-1, Examination Category B-L-1, line Items B12.10 (pump casing welds) and B12.20 (pump casing) specify a VT-1 and VT-3, respectively.
  - Accepted by NRC in RG 1.147, Rev. 9 (April 1992)
  - Industry believes VT-1 and VT-3 examinations are adequate. EVT-1 method has not been agreed upon for examination of internal surfaces due to high dose and is not needed based upon completion of the flaw tolerance evaluation

Industry Perspective on NRC Position on SRP-SLR Table 3.1-1, Line 38

- (NRC Recommendation) Pump casings should be subject to recommendations of the AMP or component-specific flaw evaluations if the screening criteria are not met
- Industry Response
  - Lower bound of the fracture toughness is used in the integrity analysis for WCAP-13045 (Accession #s 9111080138 & 9304280076)
  - Per section 4.2 of WCAP-15555 (fully aged) saturated toughness based on actual SPS chemistry was used for the flaw tolerance assessment for 60 years. Thus, the flaw tolerance assessment is not limited to 60 years since saturated properties are used. This is the case for other sites as well.

Industry Perspective on NRC Position on SRP-SLR Table 3.1-1, Line 38

- Industry believes that the recommendations shared by NRC are not necessary because
  - Saturated toughness is used to assess thermal embrittlement,
  - ASME code VT-1, VT-2, and VT-3 inspections are adequate for pumps with flaw tolerance evaluations,
  - Not susceptible to thermal aging and screening not required per NUREG-1801 XI.M12

Industry Response on NRC Position on SRP-SLR Table 3.1-1, Line 38

- Industry recommends and requests that the NRC
  - Reinstate the language in AMP XI.M12 for SLR to exclude pump casings from the additional aging management recommendations of XI.M.12
  - The basis for this request and recommendation is that
    - ✓ saturated toughness (fully aged) is used to assess thermal embrittlement,
    - ✓ ASME code VT-1, VT-2, and VT-3 inspections are adequate for pumps with flaw tolerance evaluations,
    - ✓ Not susceptible to thermal aging and screening not required per NUREG 1801 Rev 2 XI.M12.
  - Existing flaw tolerance evaluations are judge acceptable. Pump casing should be inspected Section XI, Table IWB-2500-1, Item Numbers B12.10 and B12.20
  - One way to reach consensus on this issue is through interaction with Section XI Subgroup on Evaluations Standards
  - Another avenue is through interaction with the PWROG

Are there questions that require technical discussion?