From: Gleaves, Billy
Sent: Thursday, December 10, 2020 7:03 AM
To: Vogtle PEmails
Cc: Schiller, Alina
Subject: FW: Slides for Presubmittal Meeting Tomorrow
Attachments: VEGP 34 Code Alternative for Weldolets - Presentation for Dec 10 Pre-Submittal Meeting.pdf

This email is being sent to ADAMS for public release of the 12.10.2020 meeting. This was received the night before at 6:19pm EST.

Billy

William (Billy) Gleaves
Senior Project Manager
NRR/Vogtle Project Office
US Nuclear Regulatory Commission

From: Leighty, Steven <sleighty@southernco.COM>
Sent: Wednesday, December 9, 2020 6:19 PM
To: Gleaves, Billy <Bill.Gleaves@nrc.gov>; Schiller, Alina <Alina.Schiller@nrc.gov>
Cc: Roberts, Kelli Anne <KROBERTS@southernco.com>; Chapman, Nathan B. <NBCHAPMA@SOUTHERNCO.COM>; Arafeh, Yasmeen N. <YNARAFEH@southernco.com>
Subject: [External_Sender] Slides for Presubmittal Meeting Tomorrow

Billy/Alina,

Attached are slides we put together to aid in the presubmittal meeting tomorrow morning. The slides are non-proprietary. The intent of these slides is to help address the feedback the staff has provided ahead of the meeting tomorrow.

We appreciate all the feedback we have received from the staff so far and look forward to our discussion tomorrow morning.

Thanks,

Steve Leighty | Southern Nuclear
Licensing Supervisor | Vogtle 3&4
706.848.6790 | sleighty@southernco.com

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Subject: FW: Slides for Presubmittal Meeting Tomorrow
Sent Date: 12/10/2020 7:03:03 AM
Received Date: 12/10/2020 7:03:06 AM
From: Gleaves, Billy

Created By: Bill.Gleaves@nrc.gov

Recipients:
"Schiller, Alina" <Alina.Schiller@nrc.gov>
Tracking Status: None
"Vogtle PEmails" <Vogtle.PEmails@nrc.gov>
Tracking Status: None

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Alternative Request to ASME Section XI Code Examination Requirements for Weldolets

Pre-submittal Meeting

December 10, 2020

Plant Vogtle Units 3&4

Southern Nuclear

Background

- Challenges have been identified with volumetric Section XI examination requirements for Weldolet ASME Class 1 Branch Connections in the Reactor Coolant System (RCS) Pressure Boundary
  - Four applicable weldolets total [two in each Unit (3&4)]
  - Located on branch connection lines within Automatic Depressurization System (ADS) Stage 1 piping
  - Examination Volume not achievable for subject weldolets due to the geometry of the welds
  - Challenges with these configurations are typical, and are frequently captured in relief requests

Reason for Request

- ASME Examination Category B-J Requirements for Pressure Retaining Welds
  - NPS >= 4, 100 percent surface and volumetric examinations for branch connection welds (B9.31)
  - NPS < 4, Surface examinations only
- 10 CFR 50.55a(g)(2)(ii)
  - ASME Code Class 1, 2, and 3 components must be designed for inspectability
  - The proposed best effort examinations, along with a flaw tolerance evaluation conducted showing acceptable structural integrity margin for the weldolet to pipe location, meets the intent of the code requirements

Proposed Alternative

- Best Effort Volumetric Examination
  - Conducted to the maximum extent practical
  - Single-side PDI-UT-2 examinations were performed
    - » Maximum axial coverages of 72.9% and circumferential coverages of 55.4% were achieved for each of the two Unit 3 weldolets
- Surface Examination
  - Coverage of 100% was achieved using a liquid penetrant method
- Acceptance Criteria
  - No indications that exceed the acceptance criteria were recorded
  - In accordance with IWB-3000 for Class 1 systems

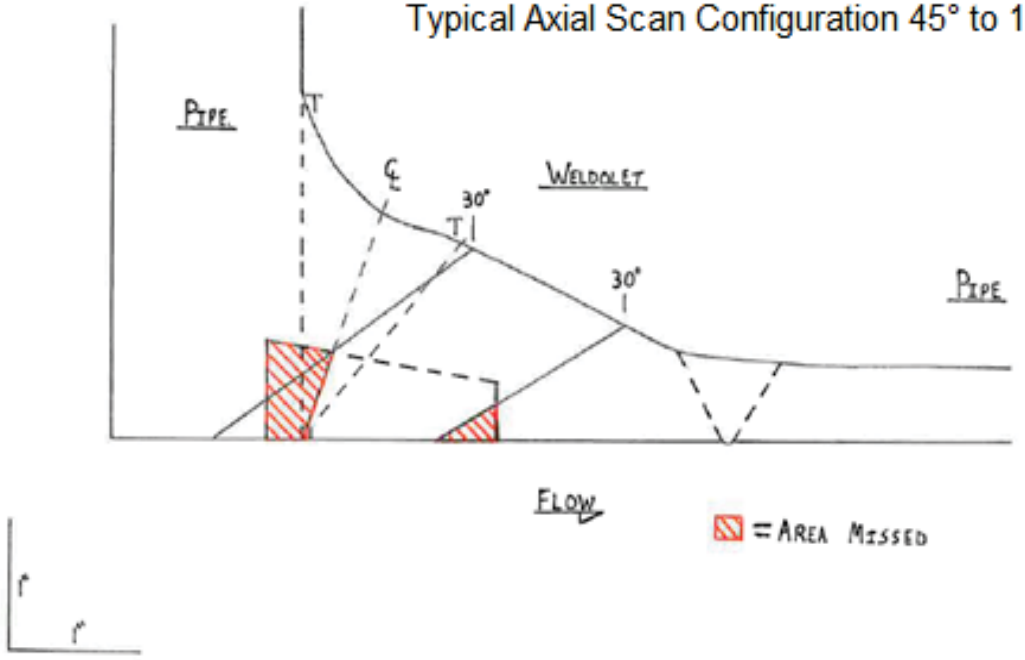
PDI-UT-2 Examination Coverage

The following figures display the extent of coverage obtained during the PDI-UT-2 examinations

PDI-UT-2 Coverage

SV3-RCS-PLW-01C-SW3 & SV3-RCS-PLW-013-SW3

Typical Axial Scan Configuration 45° to 135° and 225° to 315°



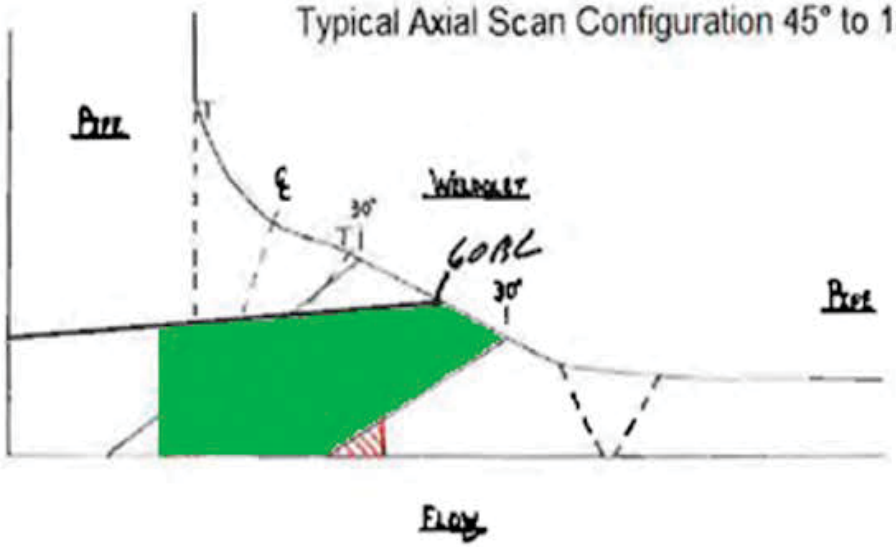
PDI-UT-2 Examination Coverage

Best Effort/Augmented Coverage

Green Area is Area Where Best Effort/Augmented Coverage Could be Attained by Adding a 60° Refracted Longitudinal Wave Search Unit in Addition to the 30° and 45° Shear Wave Search Units. The Red Hatched area on the Near Side Remains Unchanged

SV3-RCS-PLW-01C-SW3 & SV3-RCS-PLW-013-SW3

Typical Axial Scan Configuration 45° to 135° and 225° to 315°

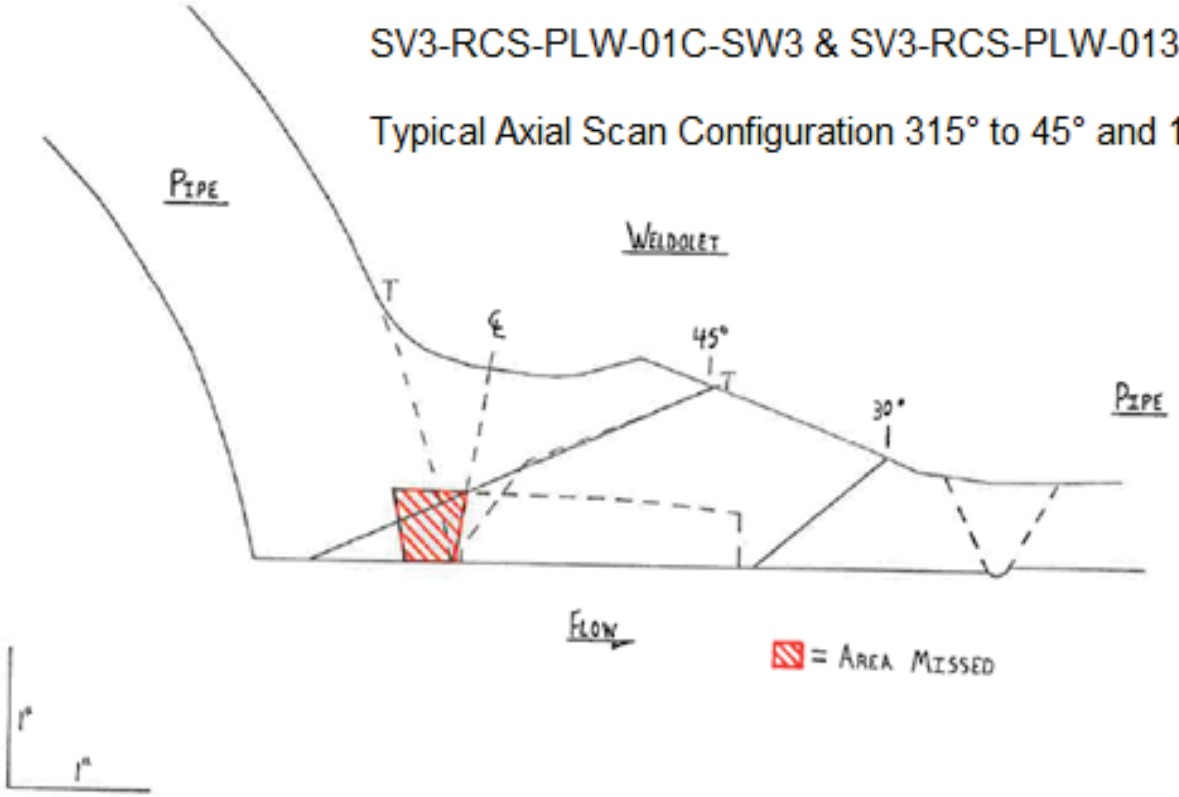


PDI-UT-2 Examination Coverage

PDI-UT-2 Coverage

SV3-RCS-PLW-01C-SW3 & SV3-RCS-PLW-013-SW3

Typical Axial Scan Configuration 315° to 45° and 135° to 225°



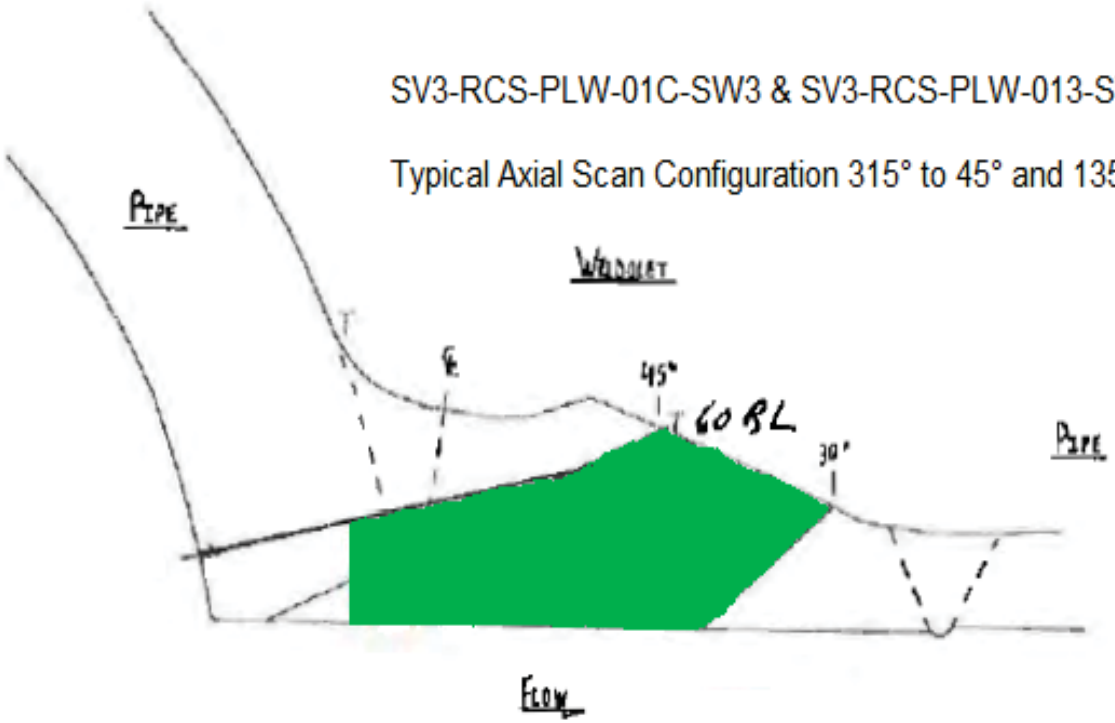
PDI-UT-2 Examination Coverage

Best Effort/Augmented Coverage

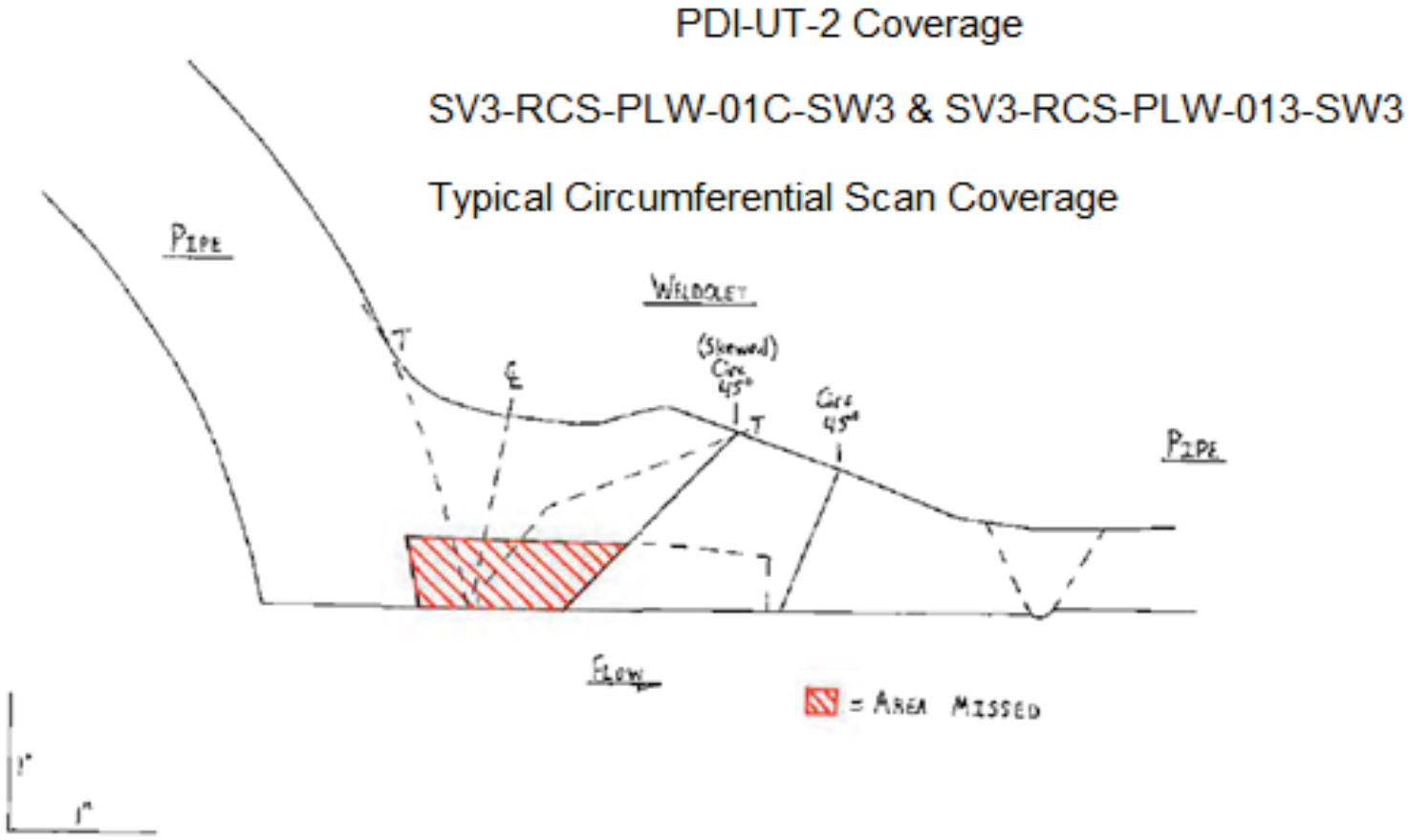
Green Area is Area Where Best Effort/Augmented Coverage Could be Attained by Adding a 60° Refracted Longitudinal Wave Search Unit in Addition to the 30° and 45° Shear Wave Search Units.

SV3-RCS-PLW-01C-SW3 & SV3-RCS-PLW-013-SW3

Typical Axial Scan Configuration 315° to 45° and 135° to 315°



PDI-UT-2 Examination Coverage



October Pre-Submittal Meeting

- Pre-submittal Meeting was held on October 15, 2020

- NRC Staff Provided Feedback on the Alternative Draft
  - Review ALT-06 scope
  - Reference precedents
  - Include details of exams performed
  - Minor editorial suggestions

Flaw Tolerance Evaluation

- Conducted by Westinghouse
  - Similar to evaluation conducted for code alternative request ALT-06 (ML1908A143)
  - Demonstrates postulated flaws will not grow to maximum end-of-evaluation flaw size for 60-year design life of the plant
  - Acceptable structural integrity margin for the weldolet to pipe location

Flaw Tolerance Evaluation

- Guidance per 2007/2008 ASME Section XI Appendix C-5000
  - Stainless steel material, weld process is GTAW
  - AP1000 Plant-specific, location specific geometry, loadings, operating conditions, and transients and cycles were used
  - Levels A, B, test, C, D conditions were considered
  - Section II material properties

- Axial and circumferential inside flaw were postulated in the missed coverage, bounds embedded and outside surface flaws.

- Maximum allowable end-of-evaluation period flaw sizes
  - Highly Flaw tolerant
  - Axial Flaw Depth = 71% of the wall thickness is acceptable
  - Circumferential flaw depth = 75% of the wall thickness is acceptable

Flaw Tolerance

- Fatigue Crack Growth Amount per ALT-06 (1% growth, design life)
  - Design transient, cycles, loading combinations are same because weldolet and pipe weld location in ALT-06 are on the same piping lines
  - Difference in the wall thickness between weldolet and ALT-06 location
  - Note that the cumulative usage factor at the ALT-06 pipe location was >0.8, while the weldolet location the CUF is less than 0.04.
  - Therefore, the range in stresses and fatigue crack will be much less at the weldolet
  - Initial Axial and circumferential flaw of 33% of the wall thickness
  - Final flaw size after 60 years = 34% of the wall thickness

Postulated Flaw Configuration	Maximum Potential Inspection Zone Flaw Size (1/3 of wall thickness) (a/t)	60 year FCG Final Flaw Size (a_p/t)	Maximum Allowable End of Evaluation Flaw Size (a_f/t)
Axial Surface Flaw	0.33	0.34	0.71
Circumferential Surface Flaw	0.33	0.34	0.75

Note: a_p = final potential flaw depth, a_f = ASME Code Maximum Allowable flaw depth, t = thickness, a = non-inspectable depth

Summary

- 100% Volumetric Section XI Examination Requirements of Subject Weldolets is Not Achievable
- SNC Requests Alternative to ASME Section XI Requirements
  - Best effort volumetric examinations
  - Surface examinations
- Flaw Tolerance Evaluation Conducted by Westinghouse
- Precedent for Approval in Industry