Florida Power & Light Company, 6501 S. Ocean Drive, Jensen Beach, FL 34957

July 20, 2009

L-2009-168
10 CFR 50.4
10 CFR 50.55a

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

Re: St. Lucie Unit 1
Docket No. 50-335
Response to Request for Additional Information
Unit 1 Third Interval Relief Request 31

On February 6, 2009, FPL submitted relief request 31 for the St. Lucie Unit 1 Third ISI Interval. The relief request dealt with the impracticality to meet the code required volume coverage of some welds in the reactor vessel as required by the ASME Code, 1989 Edition, no addenda, as clarified by Code Case N-460 due to configuration and/or the presence of permanent attachments. Relief is requested in accordance with 10CFR50.55a(g)(5)(iii). The NRC requested additional information via email that was subsequently posted in ADAMS as ML091590627.

The responses to the RAI questions are within Attachment 1. Attachment 2 contains the revised relief request.

Sincerely,

Eric S. Katzman
Licensing Manager
St. Lucie Plant

Attachments

ESK/KWF

A047
NRR

2.1 Request for Relief 31, ASME Code, Section XI, Examination Category B-A, Items B 1.11, B1.12, B 1.21 and B1.22, Reactor Pressure Vessel Shell Welds and Bottom Head Welds

The licensee's submittal states in section 6.0, *Proposed Alternative and Basis for Use*, first paragraph:

*FPL [*Florida Power and Light Company*] performed inservice examinations of selected welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1989 Edition, No Addenda, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI.*

In the fourth paragraph of the same section, the licensee's submittal states:

FPL performed ultrasonic [(UT)] examinations of all reactor vessel welds in accordance with the requirements of 10 CFR 50.55a, plant technical specifications, and the 1995 Edition, No Addenda, of ASME [Code,] Section XI to the maximum extent possible.

2.1.1 Please clarify which Edition and Addenda of the ASME Code, Section XI was used to examine the reactor pressure vessel (RPV) welds.

FPL Response: The typographical error has been corrected in the paragraph. FPL performed inservice examinations of selected welds in accordance with the requirements of 10CFR50.55a, plant technical specifications, and the 1989 Edition, No Addenda, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The 1995 Edition with Addenda through 1996 was utilized for ASME Section XI, Appendix VIII.

The licensee requested relief from examining 100% of the ASME Code-required volumes for RPV welds: Shell-to-Lower Shell Circumferential Weld (9-203), RPV Circumferential Bottom Head-to-Lower Shell Weld (10-203), RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B) and RPV Lower Head Peel Segment Welds (204-03-A through F). The licensee has provided technical descriptions and sketches; however, it is unclear from the licensee's submittal how these appurtenances specifically limit the subject examinations. For example, the roll-out sketches do not provide dimensions and there is no description of the ultrasonic scanning apparatus, or any other details of the listed obstruction (e.g., size, shape, proximity to the weld, etc.).

2.1.2 Please submit further specific information to support the basis for each limited examination in Request for Relief 31, and therefore, demonstrate impracticality. Include descriptions (written and/or sketches, as necessary) of the interferences to applied nondestructive examination (NDE) techniques. As applicable, describe NDE equipment, show accessibility limitations, and discuss whether alternative methods or advanced technologies could be employed to maximize ASME Code coverage.

FPL Response: Figure 1 has been added which provides an illustration of the contact UT head used for scanning from the vessel shell. Additional figures have been added to provide the dimensions and locations of obstructions and views of each of the affected welds showing the interference caused by the permanent attachments on the TWS robot and the affect the obstructions had on scanning. The Ultrasonic (UT) techniques for each weld were reviewed to determine if additional coverage could be achieved. For the welds included in this relief request, it is not possible to remove the permanently attached obstructions to increase ASME Code coverage without significant work, increased radiation exposure, and/or damage to the plant.

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Relief Request
In Accordance with 10 CFR50.55a(g)(5)(iii)

--Inservice Inspection Impracticality--

1. ASME Code Component(s) Affected

Class 1 pressure retaining welds in the reactor pressure vessel (RPV).

2. Applicable Code Edition and Addenda

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Rules for Inservice Inspection of Nuclear Power Plant Components, Section XI, 1989 Edition, No Addenda. The 1995 Edition with Addenda through 1996 was utilized for ASME Section XI, Appendix VIII.

3. Applicable Code Requirement

Exam Cat.	Item No.	Examination Requirements
B-A	B1.10 B1.11 B1.12	Essentially 100% volumetric examination of all longitudinal and circumferential shell welds (does not include shell to flange weld).
B-A	B1.20 B1.21 B1.22	Essentially 100% volumetric examination of accessible length of circumferential and meridional head welds.

As defined by 10CFR50.55a(g)(6)(ii)(A)(2) and ASME Code Case N-460, essentially 100% means more than 90% of the examination volume of each weld where reduction in coverage is due to interference by another component or part geometry.

4. Impracticality of Compliance

Due to the configuration of the Reactor Vessel, it is impractical to meet the examination coverage requirements of the ASME Code, Section XI, 1989 Edition, No Addenda, as clarified by Code Case N-460. Relief is requested in accordance with 10 CFR 50.55a(g)(5)(iii). These areas were found during the 3rd 10-year inservice inspection interval.

When examined, the welds listed within this request did not receive the required code volume coverage due to their configuration and/or the presence of permanent attachments. These scanning limitations prohibit essentially 100% ultrasonic examination coverage of the required examination volume.

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Described below, coupled with figures, are details of the examination limitations by weld description. Figure 1 provides an illustration of the contact UT head used for scanning from the vessel shell. Figures 2 through 15 provide the dimensions and locations of obstructions and views of each of the affected welds showing the interference caused by the permanent attachments on the Trans World System (TWS) robot and the affect of the obstructions on scanning.

RPV Intermediate Shell-to-Lower Shell Circumferential Weld (9-203)

Examination Category B-A, Item B1.11

The examination of the Figure IWB-2500-2 A-B-C-D volume is limited due to the six surveillance capsule holders. Access to approximately 16.9% of the examination volume is restricted. The remaining examination volume was examined with techniques which have been qualified by demonstration in accordance with Supplements 4 & 6 of the 1995 Edition with Addenda through 1996 of the ASME Code Section XI, Appendix VIII, using the Performance Demonstration Initiative Protocol. This weld was examined from both sides of the weld, scanning both parallel and perpendicular. These ultrasonic examinations did not reveal any recordable or reportable flaws in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

Figure 2 is a view of the TWS robot in the vessel shell region showing scan limitations caused by the six surveillance capsule holders. The weld is covered by the six surveillance capsule holders. Figure 3 provides dimensional information for the six surveillance capsule holders and their affect on scanning. Figure 4 is a roll out view showing the reactor vessel inside surface scan areas (cross hatched) and the locations of limited areas due to the presence of the six surveillance capsule holders.

RPV Circumferential Bottom Head-to-Lower Shell Weld (10-203)

Examination Category B-A, Item B1.21

The examination of the Figure IWB-2500-3 A-B-C-D volume is limited due to the proximity of the Core Barrel Stabilizers and Core Lugs. Access to approximately 29.4% of the examination volume is restricted. The remaining examination volume was examined with techniques which have been qualified by demonstration in accordance with Supplements 4 & 6 of the 1995 Edition with Addenda through 1996 of the ASME Code Section XI, Appendix VIII, using the Performance Demonstration Initiative Protocol. This weld was examined from both sides of the weld, scanning both parallel and perpendicular to the weld. The ultrasonic examination identified three IWB-3510 acceptable indications in accordance with the ASME Code Section XI, 1989 Edition, No Addenda, acceptance criteria.

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Figure 5 is a view of the TWS robot in the vessel shell region showing scan limitations caused by the Core Barrel Stabilizers and Core Lugs. Figure 6 provides dimensional information for the core barrel stabilizers and core lugs and their locations in the reactor vessel. Figure 7 is a roll out view showing the reactor vessel inside surface scan areas (cross hatched) for the bottom head-to-lower shell weld and the locations of limited areas due to the presence of the core barrel stabilizers and core lugs.

RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B)

Examination Category B-A, Item B1.12

The examination of the Figure IWB-2500-2 A-B-C-D volume is limited due to the outlet nozzle at zero degrees integral extension. Access to approximately 36.8% of the examination volume is restricted. The remaining examination volume was examined with techniques which have been qualified by demonstration in accordance with Supplements 4 & 6 of the 1995 Edition with Addenda through 1996 of the ASME Code Section XI, Appendix VIII, using the Performance Demonstration Initiative Protocol. This weld was examined from both sides of the weld, scanning both parallel and perpendicular. These ultrasonic examinations did not reveal any recordable or reportable flaws in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

Figures 8 and 9 are views of the TWS robot in the vessel shell region showing the scan limitation caused by the outlet nozzle at zero degrees integral extension. Figure 10 provides dimensional information and the affect the outlet nozzle at zero integral extension had on scanning. Figure 11 is a roll out view showing the reactor vessel inside surface scan areas (cross hatched) for the upper shell longitudinal seam weld at 15 degrees.

RPV Lower Head Peel Segment Welds (204-03-A through F)

Examination Category B-A, Item B1.22

The examination of the Figure IWB-2500-3 E-F-G-H volume is limited due to the proximity of the flow baffle. Access to approximately 46.7% of welds 204-03-B, 204-03-D, 204-03-F and 56.6% of welds 204-03-A, 204-03-C, 204-03-E examination volume is restricted due to limited access behind the flow baffle. The remaining examination volume was examined with techniques which have been qualified by demonstration in accordance with Supplements 4 & 6 of the 1995 Edition with Addenda through 1996 of the ASME Code Section XI, Appendix VIII, using the Performance Demonstration Initiative Protocol. The welds were examined from both sides of the weld, scanning both parallel and perpendicular to the weld. These ultrasonic examinations did not reveal any recordable or reportable flaws in accordance with the ASME Code Section XI, 1989 Edition, No Addenda.

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Figures 12 and 13 are views of the TWS robot in the vessel shell region showing scan limitations due to limited access behind the flow baffle and core lugs. Figure 14 provides dimensional information for the core lugs and core baffle and their affect on scanning. Figure 15 is a roll out view showing the reactor vessel inside surface scan areas (cross hatched) for the peel segment welds and the locations of the core lugs.

5. Burden Caused by Compliance

It is not possible to obtain ultrasonic interrogation of greater than 90% of the required examination volume due to interference caused by configuration and/or permanent attachments. Examinations were performed to the maximum extent possible. For the welds listed in this relief request, it is not possible to remove the permanently attached obstructions to increase ASME Code coverage without significant work, increased radiation exposure, and/or damage to the plant.

6. Proposed Alternative and Basis for Use

Proposed Alternative

1) Periodic system pressure tests in accordance with ASME Section XI Category B-P, Table IWB-2500-1.

2) Conduct ultrasonic examinations to the maximum extent possible.

Basis

FPL performed inservice examinations of selected welds in accordance with the requirements of 10CFR50.55a, plant technical specifications, and the 1989 Edition, No Addenda, of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, Section XI. The 1995 Edition with Addenda through 1996 was utilized for ASME Section XI, Appendix VIII. When a component has conditions which limit the examination volume, Florida Power and Light is required to submit the information to the enforcement and regulatory authorities having jurisdiction at the plant site. This Relief Request has been written to address areas where those types of conditions exist and the required amount of coverage was reduced below the minimum acceptable.

FPL performed mechanized ultrasonic examinations of the reactor vessel during the November 2008 refueling outage.

10 CFR 50.55a(g)(4) recognizes that throughout the service life of a nuclear power facility, components which are classified as ASME Code Class 1, Class 2, and Class 3 must meet the requirements set forth in the ASME Code to the extent practical within the limitations of design, geometry and materials of construction of the components.

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The mechanized techniques employed for examination from the RPV inside have been demonstrated in accordance with Supplements 4 & 6 of the 1995 Edition with Addenda through 1996 of the ASME Code Section XI, Appendix VIII, using the Performance Demonstration Initiative Protocol. The Ultrasonic (UT) techniques for each weld were reviewed to determine if additional coverage could be achieved. Access for examination of the affected welds from the outside of the reactor vessel is not possible. Access and permanently installed attachments inside the reactor vessel limit additional scanning of the welds included in this request for relief.

In addition to the required ultrasonic examination, the interior of the reactor vessel, including welded attachments, received a visual examination in accordance with Table IWB-2500-1, Examination Categories B-N-1, B-N-2 and B-N-3. The visual examinations revealed no indications.

The subject welds were also examined in the second interval during the 10-year reactor vessel examination. The second interval examinations did not reveal any reportable flaws.

The extent of examination volume achieved ultrasonically, the alternate scans performed, and the system pressure tests provide assurance of an acceptable level of quality and safety.

7. Duration of Proposed Alternative

Third Inservice Inspection Interval
February 11, 1998 to February 10, 2008

8. References

10CFR50.55a

ASME Section XI, "Rules For Inservice Inspection of Nuclear Power Plant Components," 1989 Edition, No Addenda

ASME Section XI, Division 1, Code Case N-460, "Alternative Examination Coverage for Class 1 and Class 2 Welds, Section XI, Division 1"

ASME Section XI, Appendix VIII, "Rules For Inservice Inspection of Nuclear Power Plant Components," 1995 Edition with Addenda through 1996

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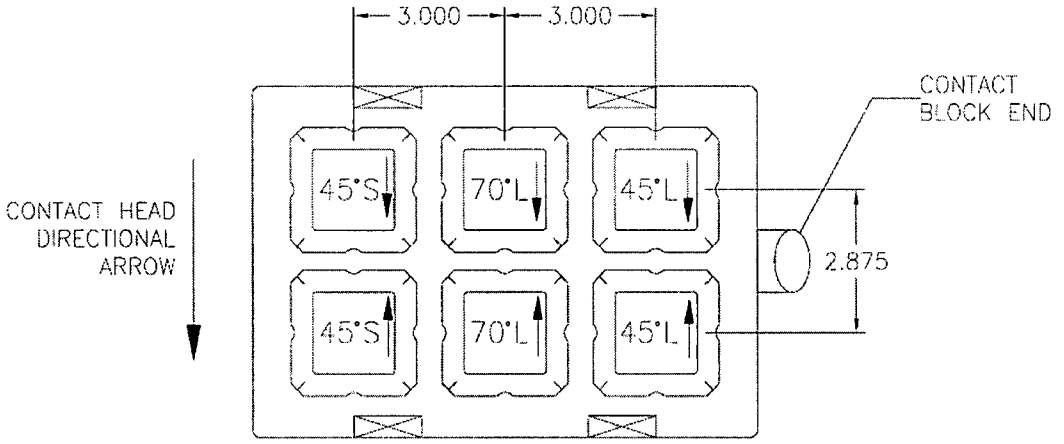

2x3 UT HEAD CONFIGURATION
FOR SHELL SCANNING
(AS VIEWED FROM BACK OF ROBOHAND COUPLING)

Illustration of the typical UT head configuration used for vessel shell weld scanning. Overall head dimensions are approximately 12" x 8".

Figure 1

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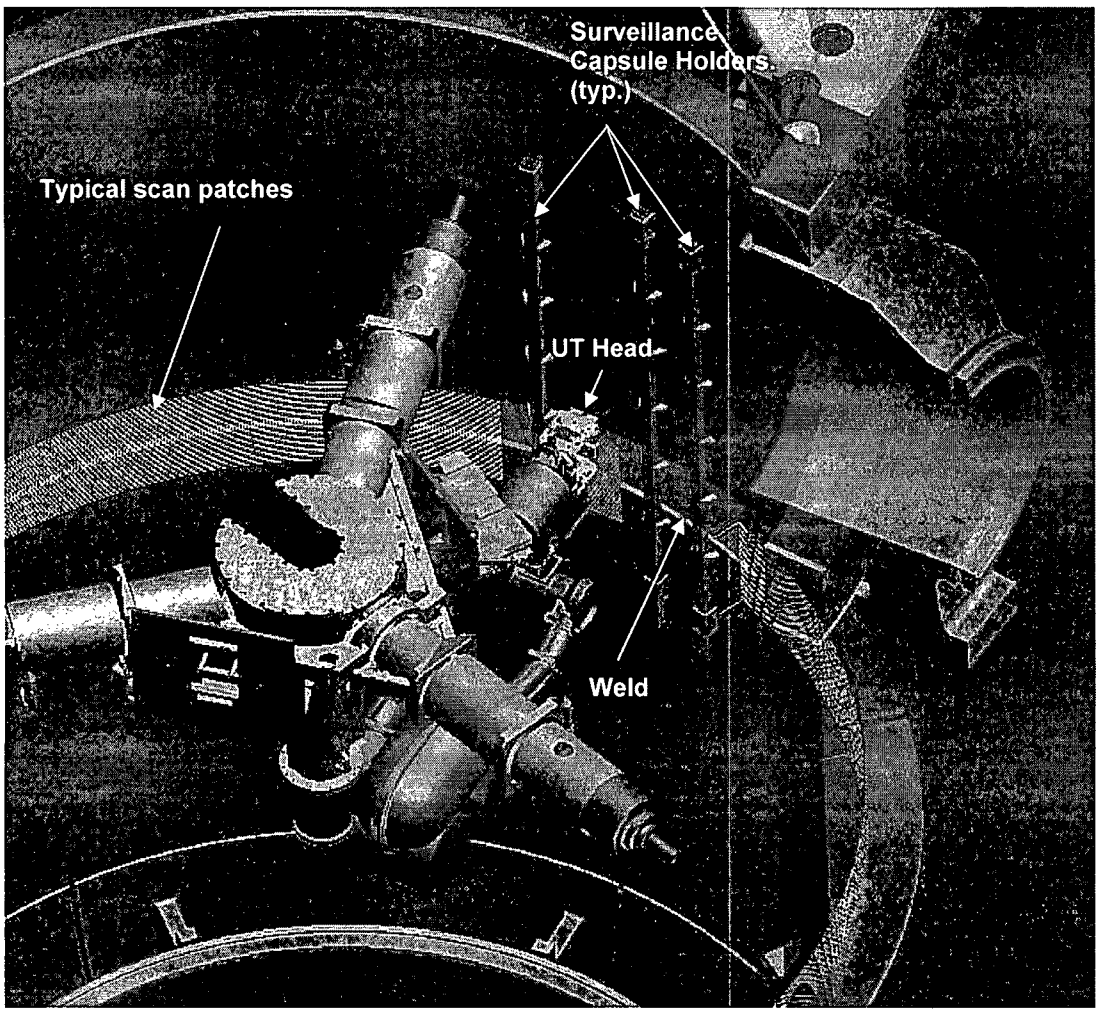

RPV Intermediate Shell-to-Lower Shell Circumferential Weld (9-203)

View of TWS robot in vessel shell region showing scan limitation caused by the surveillance capsule holders. The weld is covered by the surveillance capsule holders.

Figure 2

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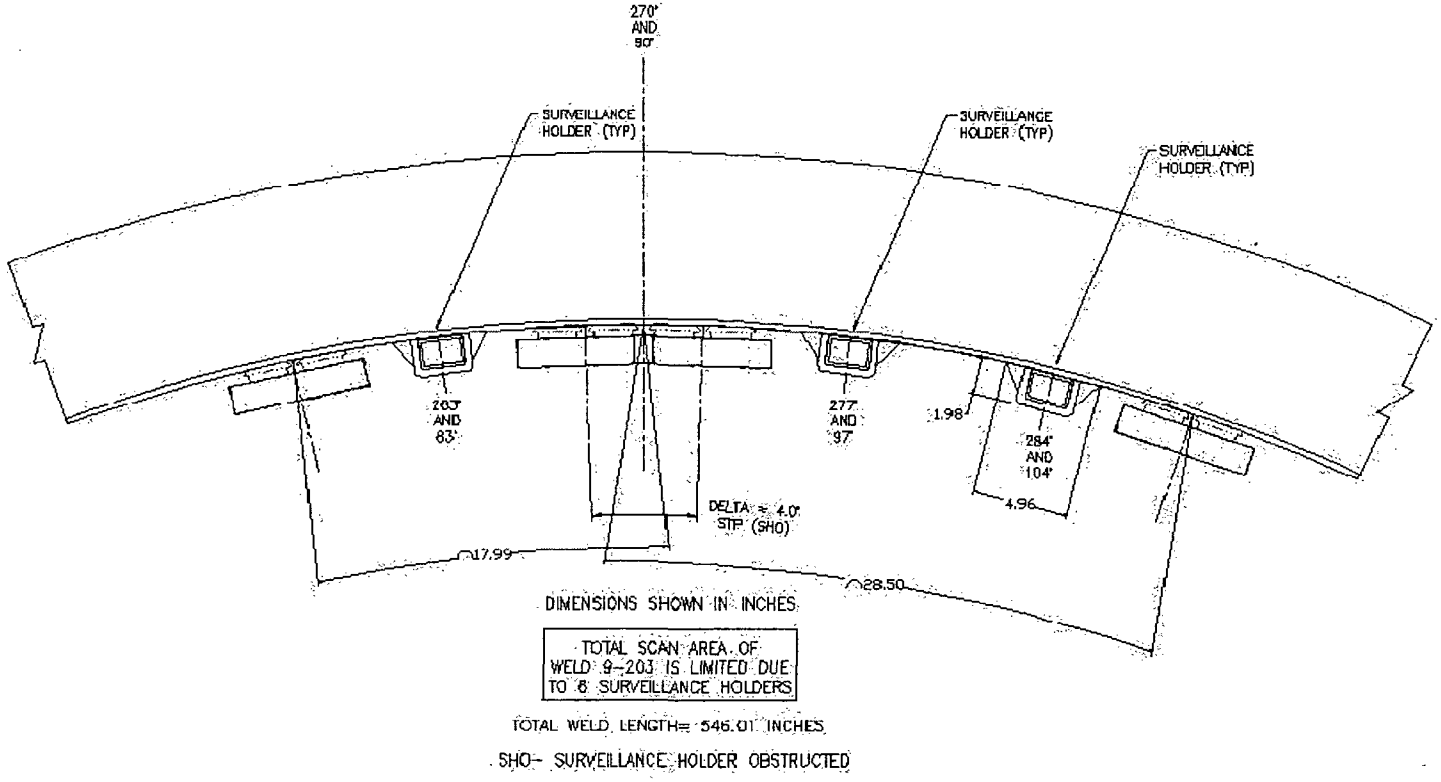

RPV Intermediate Shell-to-Lower Shell Circumferential Weld (9-203)

Figure 3

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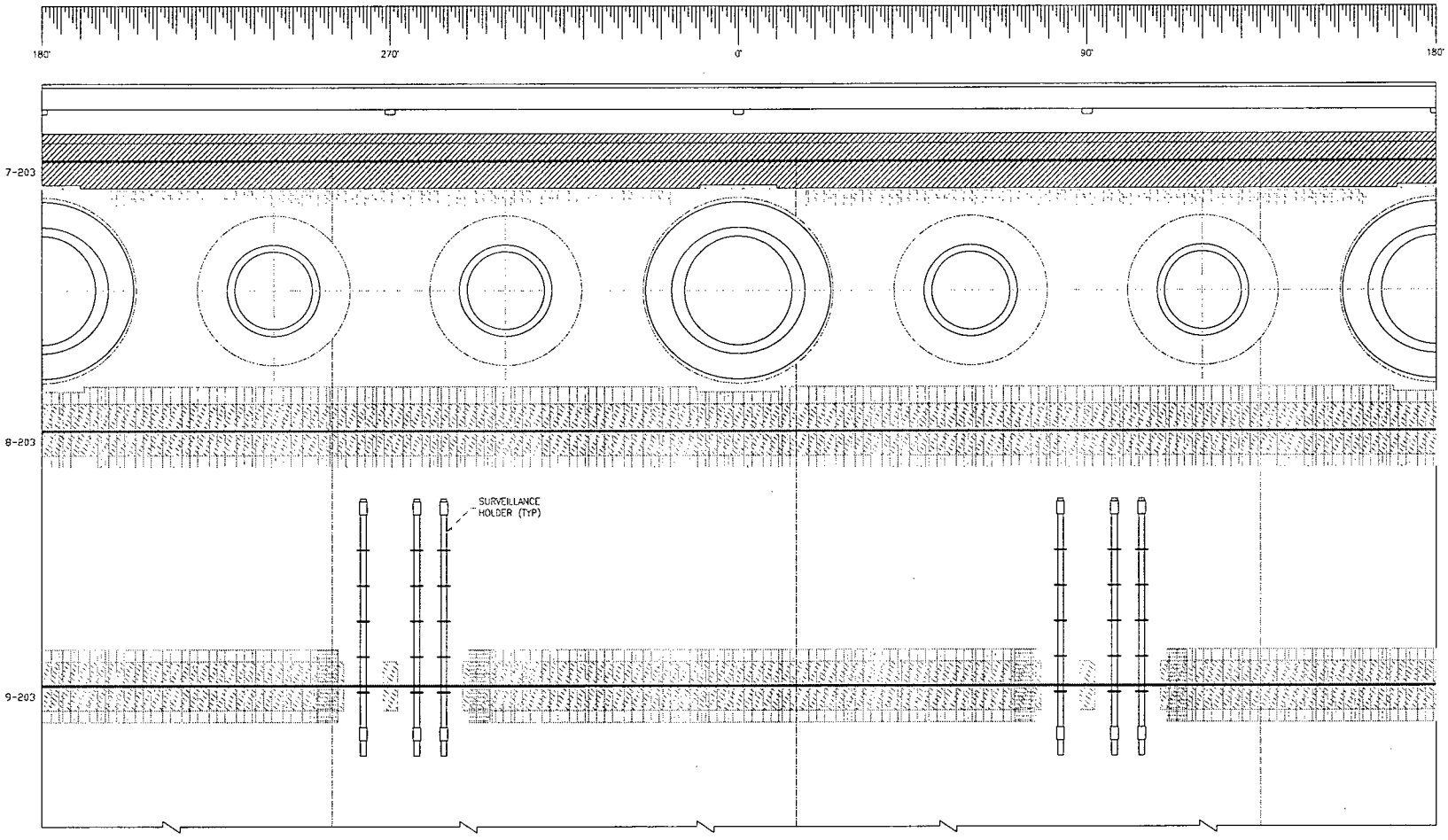

RPV Intermediate Shell-to-Lower Shell Circumferential Weld (9-203)
Figure 4

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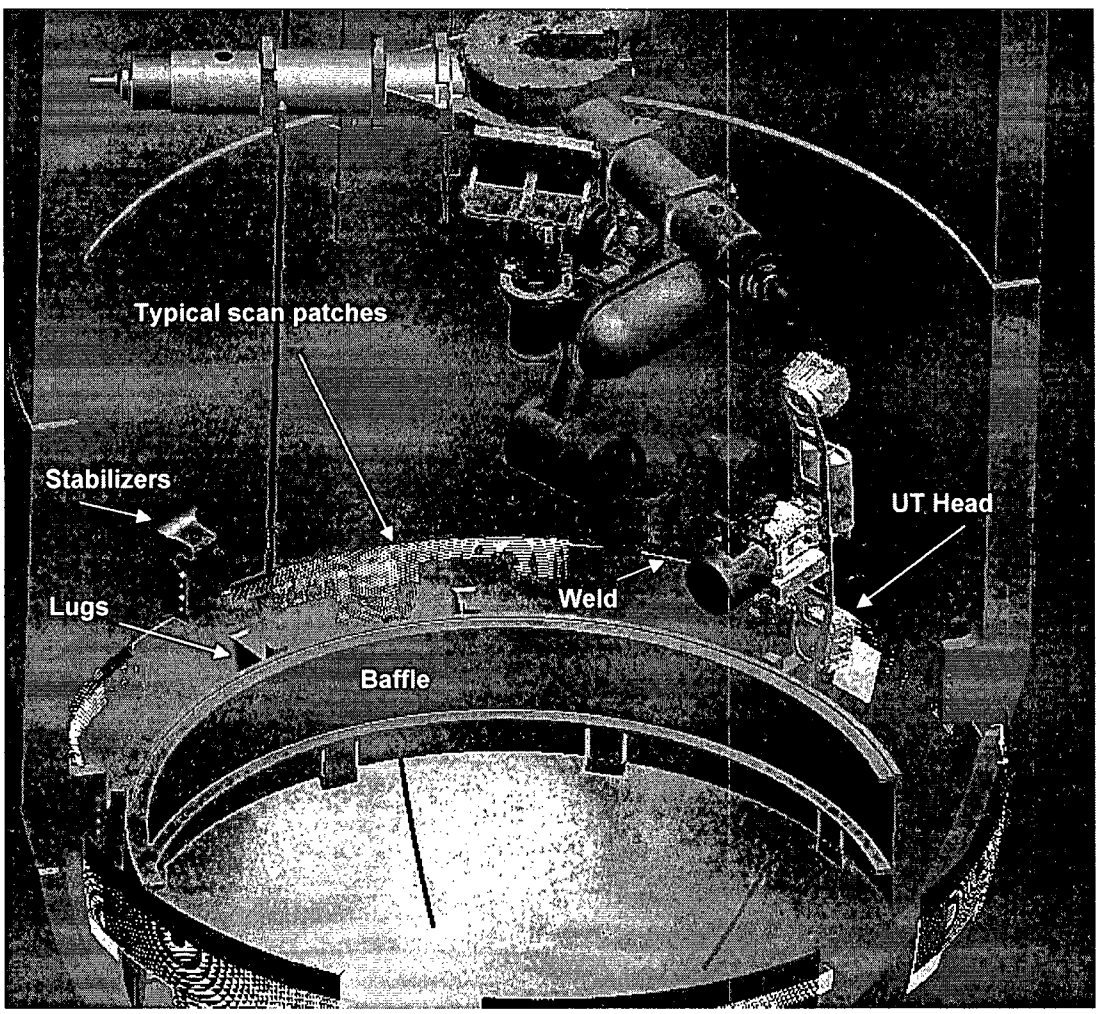

RPV Circumferential Bottom Head-to-Lower Shell Weld (10-203)

View of TWS robot in lower vessel shell region showing scan limitation caused by the Core Barrel Stabilizers and Core Lugs. The weld examination is obstructed by the Core Barrel Stabilizers and Core Lugs.

Figure 5

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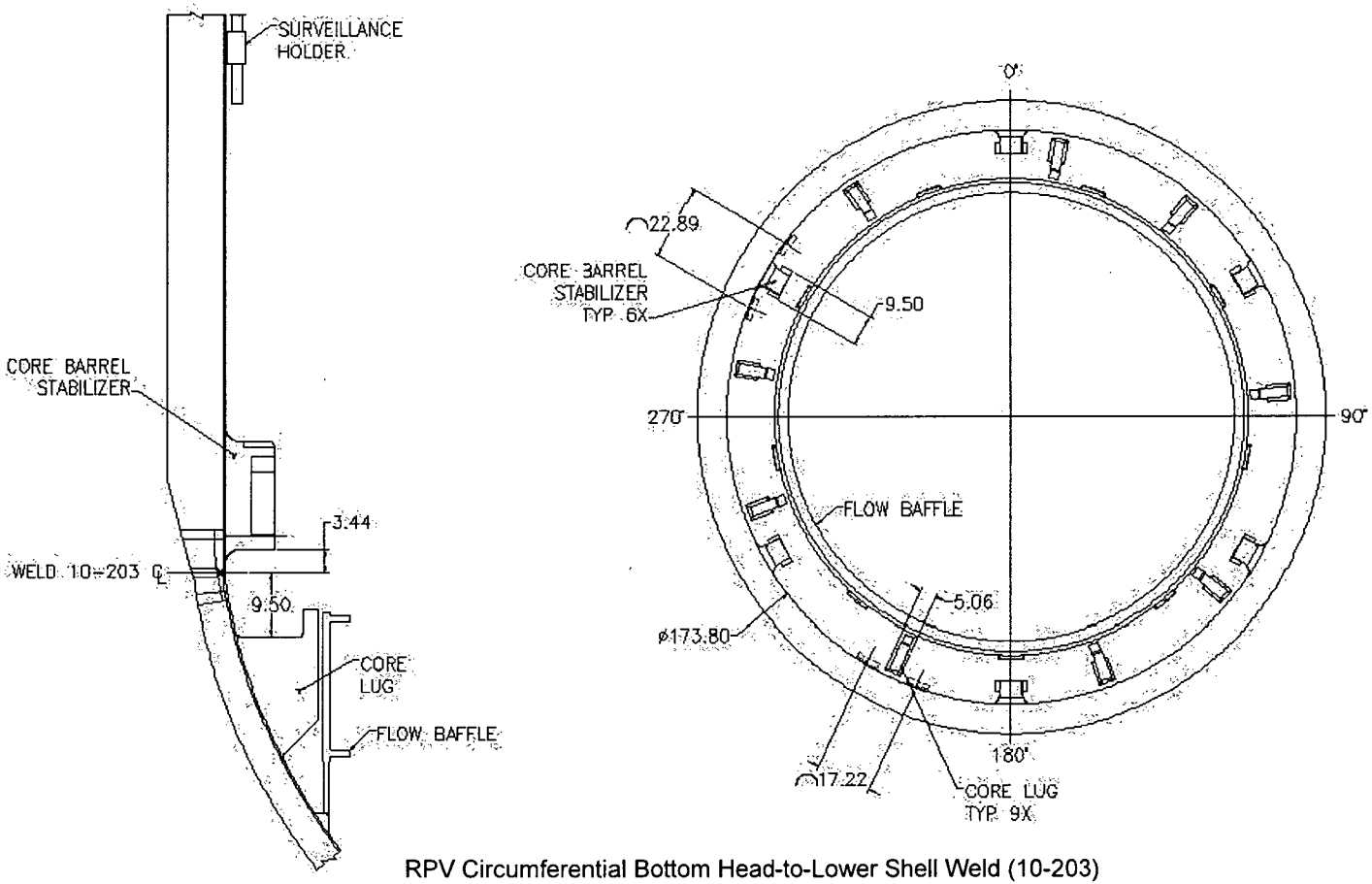

RPV Circumferential Bottom Head-to-Lower Shell Weld (10-203)

Figure 6

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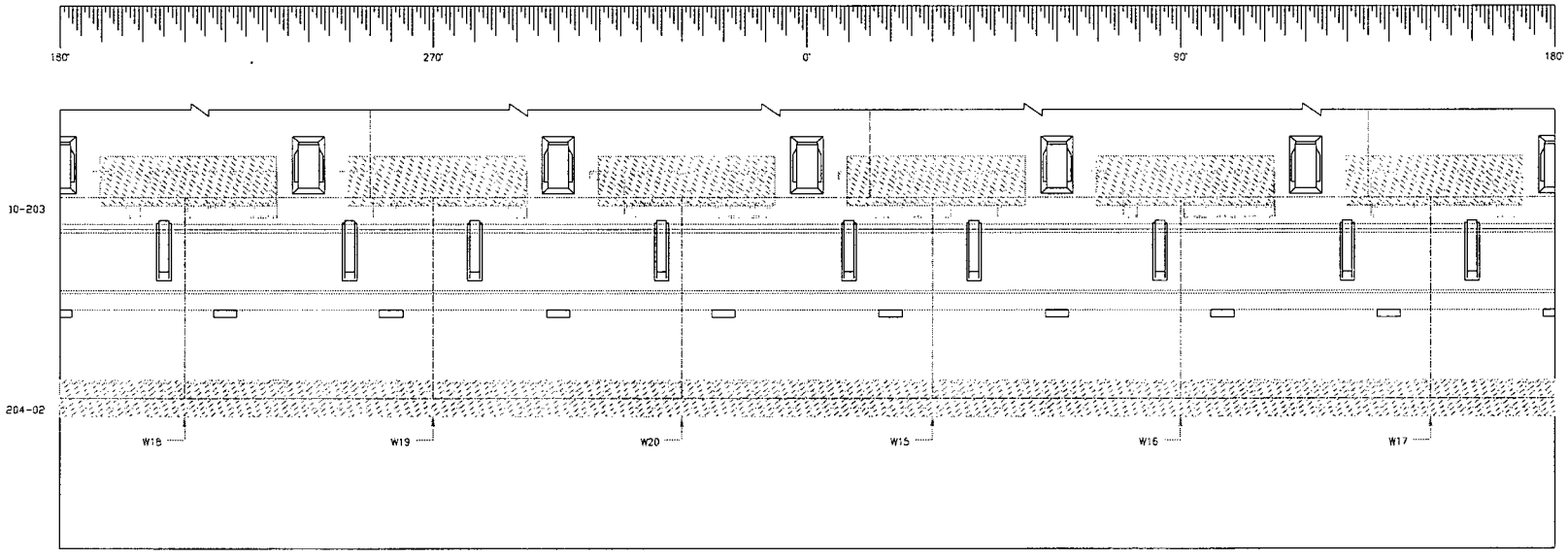

RPV Circumferential Bottom Head-to-Lower Shell Weld (10-203)

Figure 7

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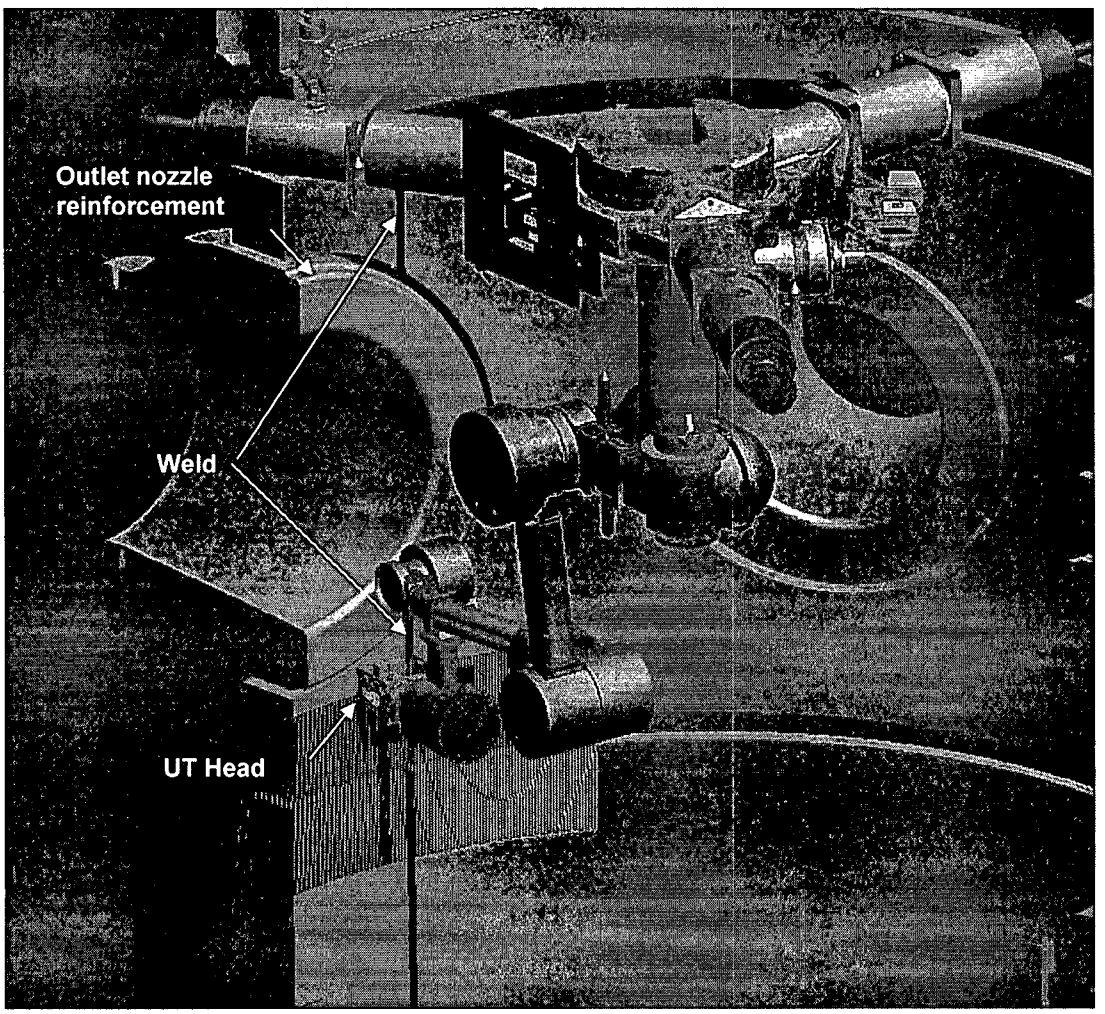

RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B)

View of TWS robot in upper vessel nozzle belt region showing scan limitation caused by the outlet nozzle reinforcement. The weld intersects the outlet nozzle and limits head movement.

Figure 8

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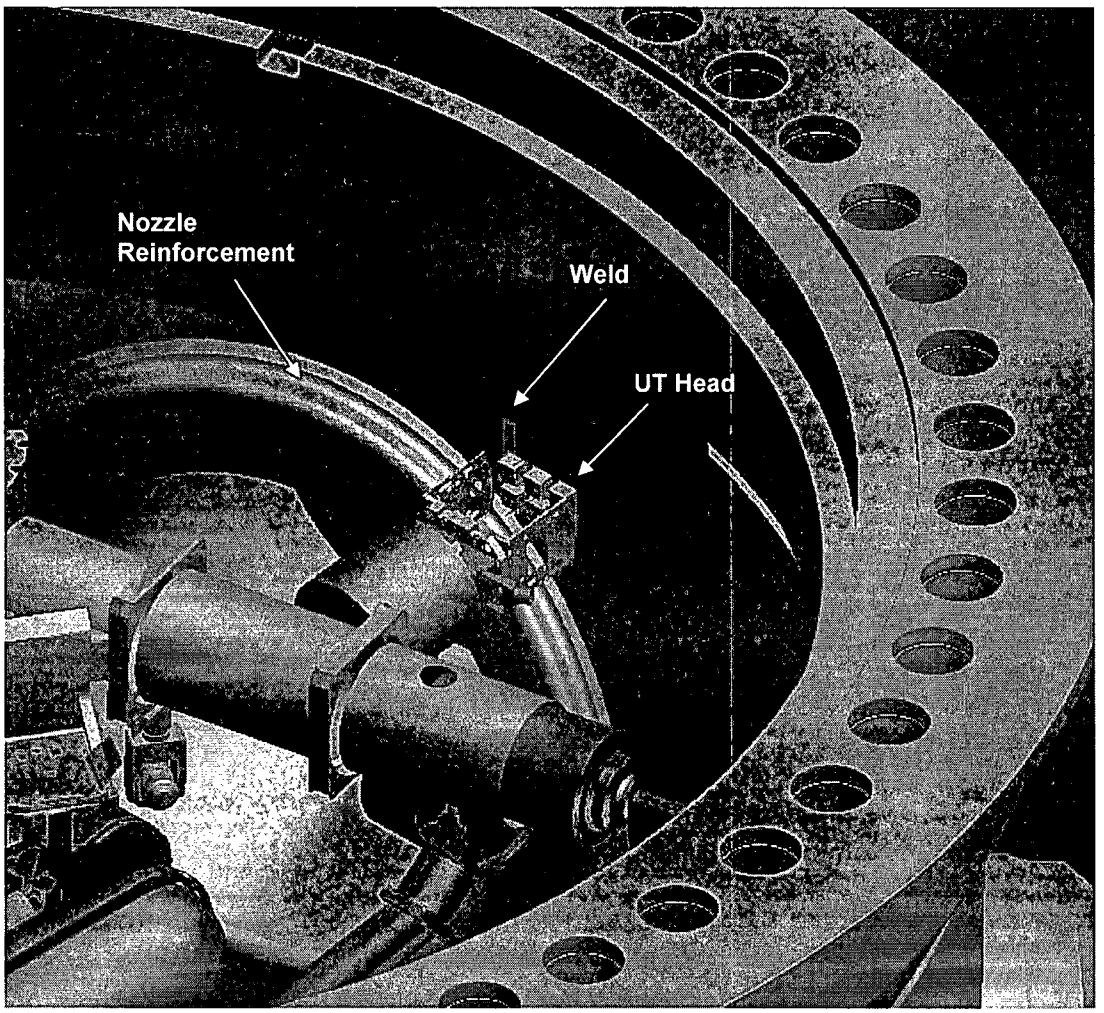

RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B)

View of TWS robot in upper vessel nozzle belt region showing scan limitation caused by the outlet nozzle reinforcement. The weld intersects the outlet nozzle and limits head movement.

Figure 9

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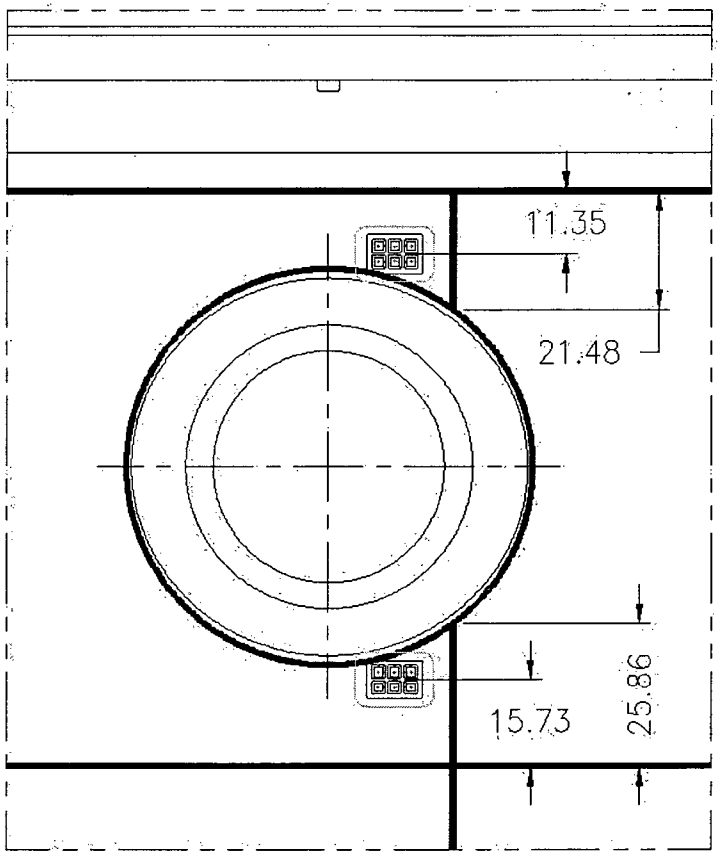

RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B)

Figure 10

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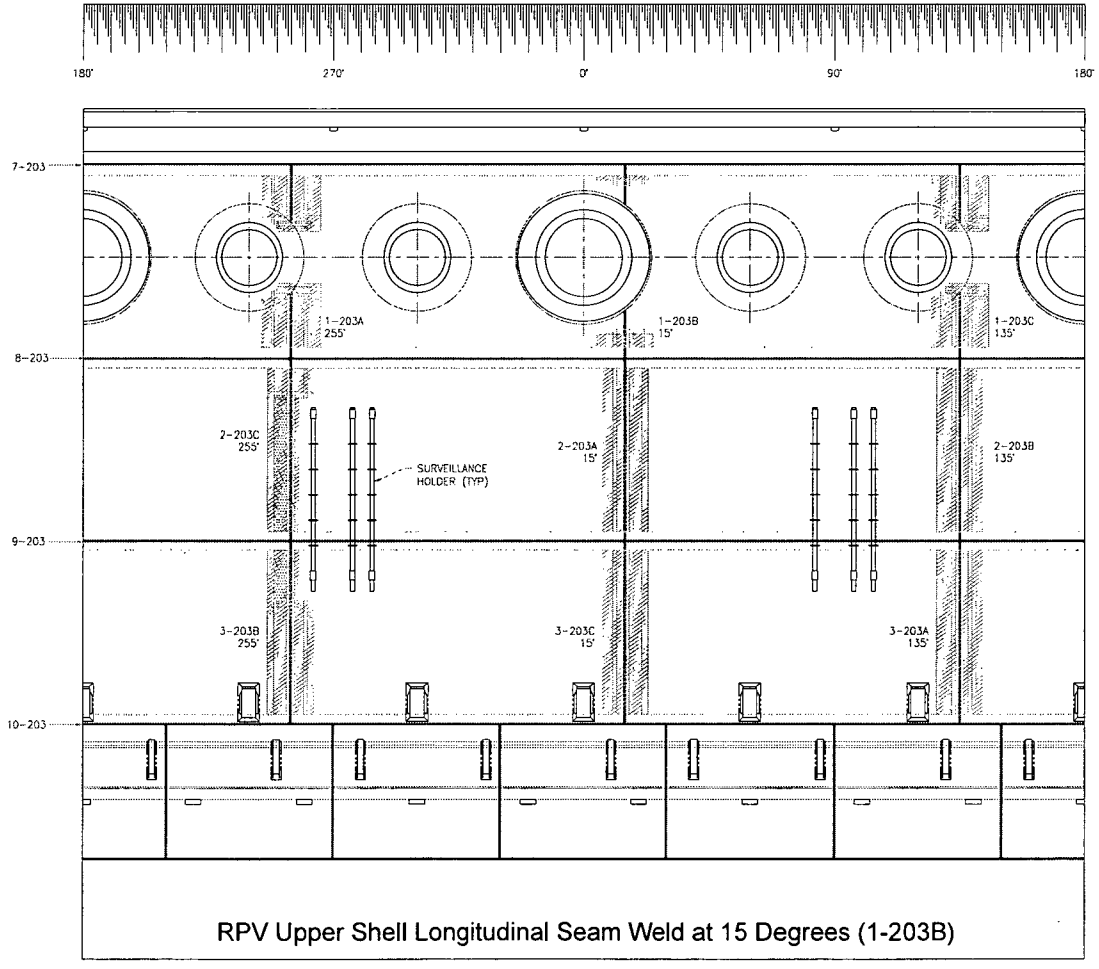

RPV Upper Shell Longitudinal Seam Weld at 15 Degrees (1-203B)

Figure 11

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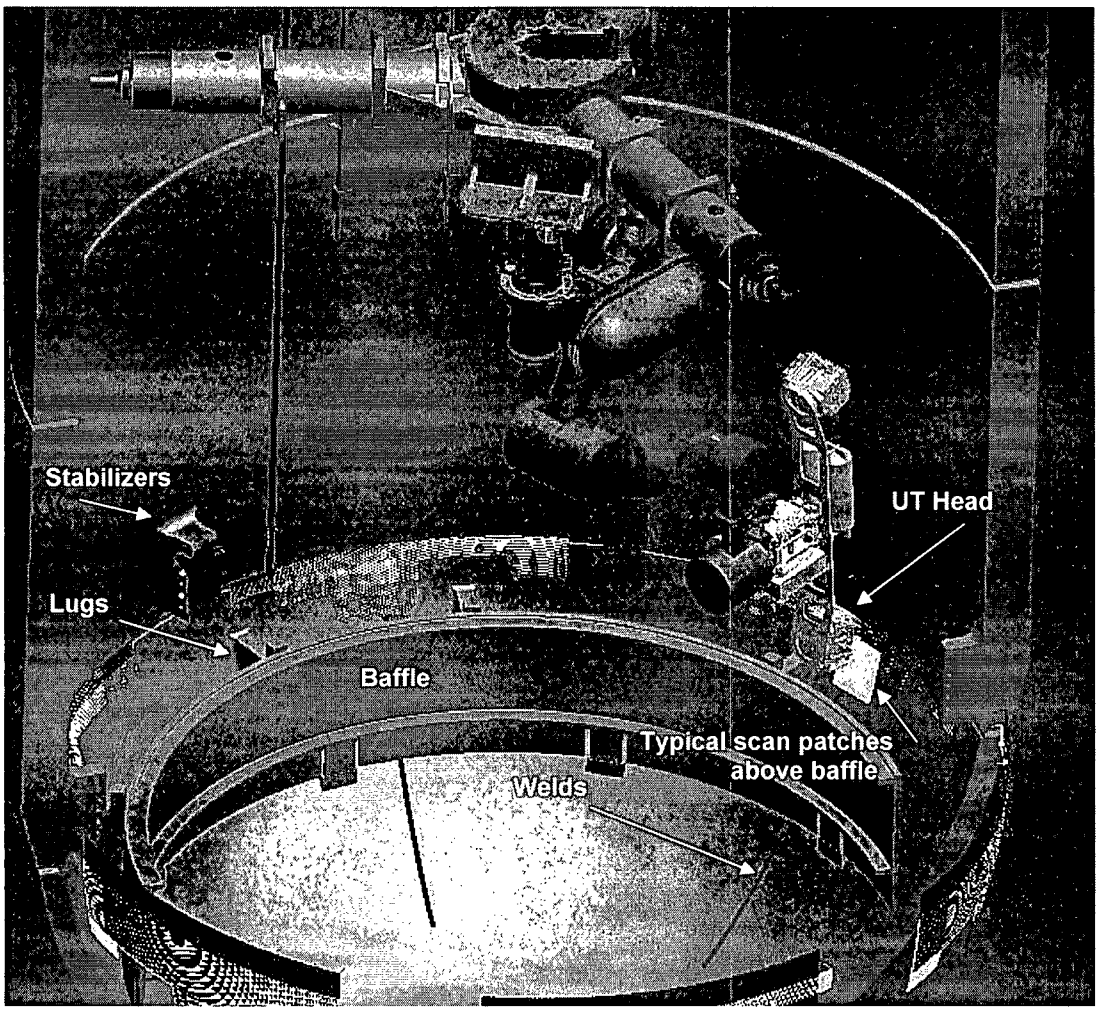

RPV Lower Head Peel Segment Welds (204-03-A through F)

View of TWS robot in lower head above flow baffle showing scan limitation caused by the baffle and core lugs. This view shows both the circumferential weld and peel welds. The affected lower head peel welds are partially covered by the baffle.

Figure 12

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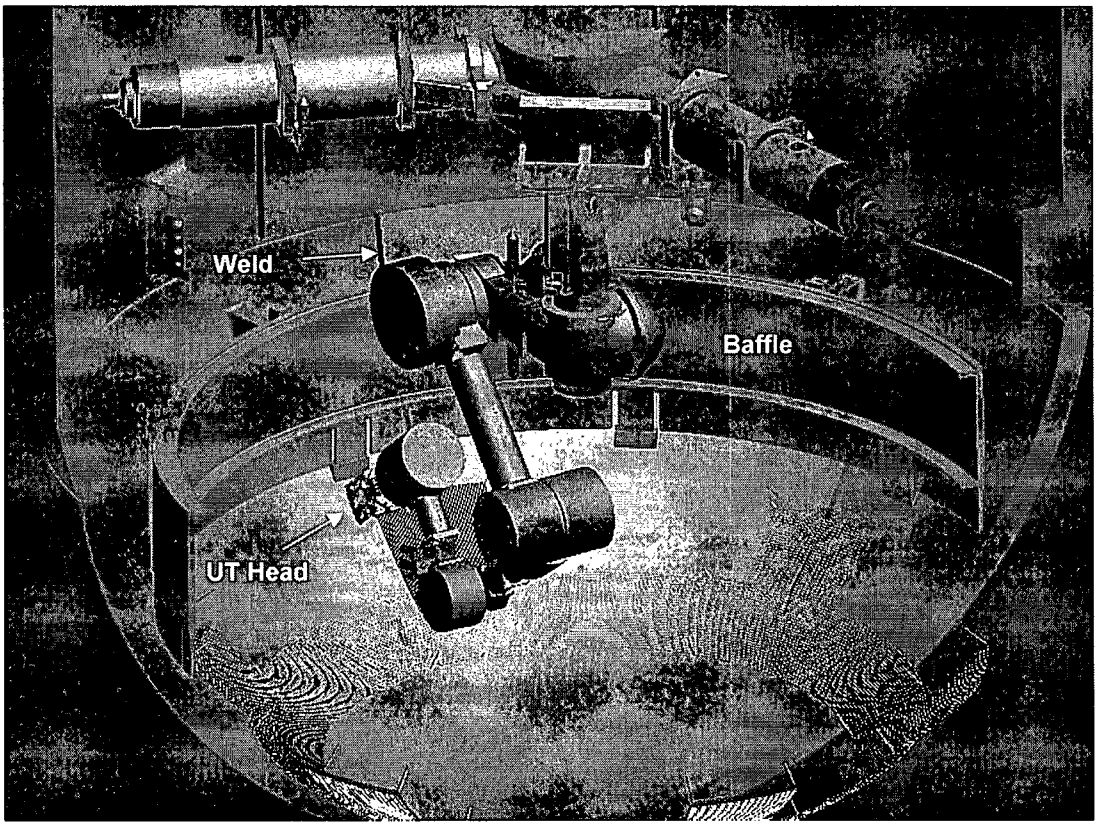

RPV Lower Head Peel Segment Welds (204-03-A through F)

View of TWS robot in lower head below flow baffle showing scan limitation caused by the baffle. The affected welds are partially covered by the baffle. The affected lower head peel welds are partially covered by the baffle.

Figure 13

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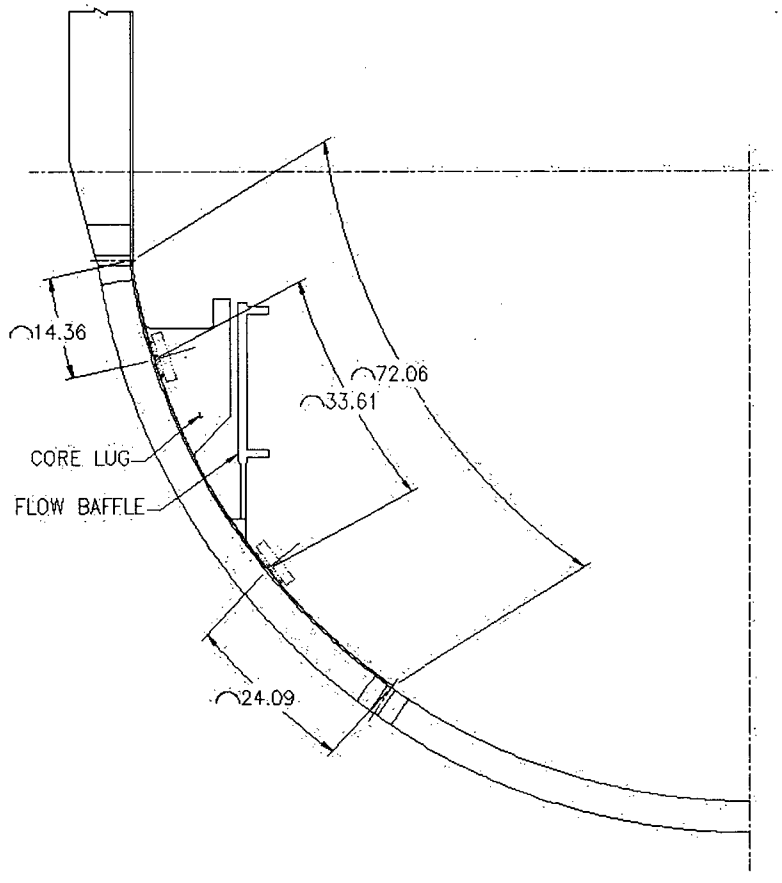

RPV Lower Head Peel Segment Welds (204-03-A through F)

Figure 14

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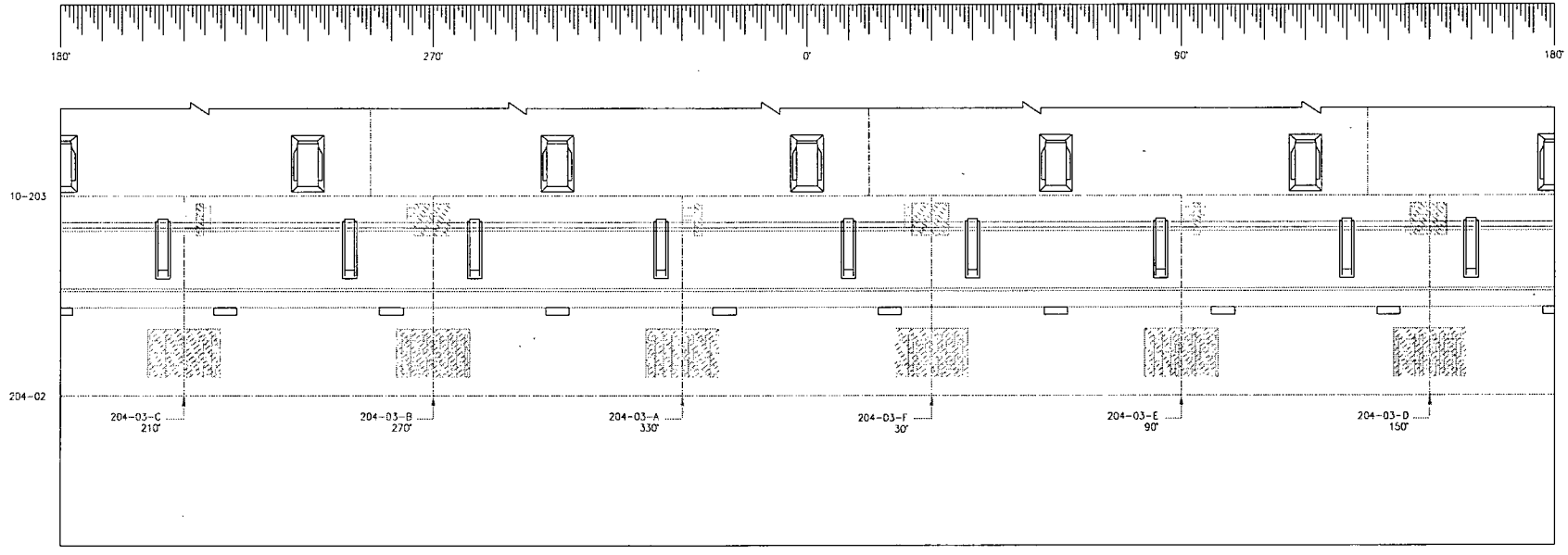

RPV Lower Head Peel Segment Welds (204-03-A through F)

Figure 15