Existing Text of UW-51(a)(4):

(4) As an alternative to the radiographic examination requirements above, all welds in which the thinner of the members joined is 1/4 in. (6 mm) thick and greater may be examined using the ultrasonic (UT) method specified by UW-53(b).

Existing Text of UW-53:

**UW-53 ULTRASONIC EXAMINATION OF WELDED JOINTS**

(a) Ultrasonic examination of welded joints whose joint efficiency is not determined by ultrasonic examinations may be performed and evaluated in accordance with Mandatory Appendix 12.

(b) Ultrasonic examination of welds per UW-51(a)(4) shall be performed and evaluated in accordance with the requirements of Section VIII, Division 2, 7.5.5.

Add new subparagraph (c) as follows:

(c) Phased array manual raster ultrasonic examinations may be used to establish the joint efficiency of the final closure seam of a pressure vessel whose construction, geometric configuration, or accessibility prohibits obtaining interpretable radiographs in accordance with UW-51(a) and the ultrasonic examination requirements of (b) above, when all of the following conditions are met:

1. The absence of suitable radiographic or ultrasonic examination equipment shall not be considered acceptable justification for using these provisions.
2. The examination shall be performed in accordance with a written procedure conforming to the requirements of Section V, Article 4, Mandatory Appendices IV and V, applying phased array manual raster ultrasonic examination techniques with a linear array.
3. The examination procedure shall be qualified as set forth in Section V, Article 1, T-150(d) and Article 4, Mandatory Appendix IX.
4. Contractor qualification records of certified personnel shall be reviewed and approved by the Manufacturer and maintained by their employer.
5. Only qualified UT personnel trained in the use of the equipment who have either participated in the procedure qualification or have successfully passed a performance demonstration as set forth in T-150(a) shall conduct production scans.
6. The examination shall employ a scanner having data acquisition, encoding, and analysis abilities.
7. An initial straight beam material examination for reflectors that could interfere with the angle beam examination shall be performed manually (see Section V, Article 4, T-472).
8. For material thickness greater than 8 in. (200 mm), the area to be examined shall include the volume of the weld plus 2 in. (50 mm) on each side of the weld.
9. For material thickness 8 in. (200 mm) or less, the area to be examined shall include the volume of the weld plus the lesser of 1 in. (25 mm) or t on each side of the weld. Alternatively, the area to be examined may be reduced to include the actual heat-affected zone (HAZ) plus 1/4 in. (6 mm) of base metal beyond the heat-affected zone on each side of the weld, provided the following requirements are met:
   a. The extent of the weld HAZ is measured and documented during the weld qualification process.
   b. The ultrasonic transducer positioning is controlled using a reference mark (paint or low stress stamp adjacent to the weld) or other means that ensure that the actual HAZ plus an additional 1/4 in. (6 mm) of base metal is examined.
10. Calibration of the examination system shall be performed in accordance with the applicable requirements of Section V, Article 4, T-460.
11. Flaw sizing shall be in accordance with Section VIII, Division 2, para. 7.5.5.2.
12. Flaw evaluation and acceptance shall be in accordance with Section VIII, Division 2, para. 7.5.5.3.
A maximum weld joint efficiency of $E = 1.0$ may be assigned to final closure seams that are found to be acceptable following these examination rules. An entry shall be included in the Remarks section of the Manufacturer’s Data Report that states "Ultrasonic examination of the vessel closure seam was performed under the rules of UW-53(c)."