Proposed New Wording: (Underline words are additions and strikethroughs are deletions.)

7.3.2.1 Butt-Welds

Complete penetration and complete fusion are required for tank butt-welds joining shell plates to shell plates. Examination for the quality of the welds shall be made using either the radiographic method specified in 8.1 or alternatively, by agreement between the Purchaser and the Manufacturer, using the ultrasonic method specified in 8.3.1 (see Annex U). In addition to the radiographic or ultrasonic examination, these welds shall also be visually examined. Furthermore, the Purchaser’s inspector may visually examine all butt-welds for cracks, arc strikes, excessive undercut, surface porosity, incomplete fusion, and other defects. Acceptance and repair criteria for the visual method are specified in 8.5.

8.1.1 Application

Radiographic examination is required for shell butt-welds (see 8.1.2.2, 8.1.2.3, and 8.1.2.4), annular-plate butt-welds (see 8.1.2.9), and flush-type connections with butt-welds (see 5.7.8.11). Radiographic examination is not required for the following: roof-plate welds, bottom-plate welds, welds joining the top angle to either the roof or shell, welds joining the shell plate to the bottom plate, welds in nozzle and manway necks made from plate, or appurtenance welds to the tank. For the radiographs required for shell butt-welds, ultrasonic examination in lieu of radiography is permitted when approved by purchaser as noted in 7.3.2.1. Such ultrasonic examination shall be in accordance with 8.3.1. If ultrasonic examination in accordance ASME Section V, Appendix 4 is applied in accordance with 8.3.2 for annular ring welds and flush-type connections with butt welds, references to radiographs in 8.1.6, 8.1.7 and 8.1.8 shall also be understood to refer to ultrasonic examination.

8.1.2.9 When bottom annular plates are required by 5.5.1, or by M.4.1, the radial joints shall be radiographed or ultrasonically examined in accordance with 8.3 when approved by the Purchaser, as follows:

(a) For double-welded butt joints, one spot radiograph or ultrasonic examination shall be taken on 10% of the radial joints; or
(b) For single-welded butt joints with permanent or removable back-up bar, one spot radiograph or ultrasonic examination shall be taken on 50% of the radial joints.

Extra care must be exercised in the interpretation of radiographs of single-welded joints that have a permanent back-up bar. In some cases, additional exposures taken at an angle may determine whether questionable indications are acceptable. The minimum radiographic or ultrasonic length of each radial joint shall be 150 mm (6 in.). Locations of the examinations radiographs shall preferably be at the outer edge of the joint where the shell plate and annular plate join.

8.3 Ultrasonic Examination

8.3.1 Ultrasonic Examination in Lieu of Radiography

When ultrasonic examination is applied in order to fulfill the requirement of 7.3.2.1 for the tank shell butt-welds, the provisions of Annex U shall apply.

8.3.2 Ultrasonic Examination NOT in Lieu of Radiography in Accordance with ASME Section V, Appendix 4

8.3.2.1 When the radiographic method is applied in order to fulfill the requirement of 8.1.1 7.3.2.1, then any ultrasonic examination specified shall be in accordance with this section may be used.

8.3.2.2 The method of examination shall be in accordance with Section V, Article 4, of the ASME Code.

8.3.2.3 Ultrasonic examination shall be performed in accordance with a written procedure that is certified by the Manufacturer to be in compliance with the applicable requirements of Section V of the ASME Code.

8.3.2.4 Examiners who perform ultrasonic examinations under this section shall be qualified and certified by the Manufacturers as meeting the requirements of certification as generally outlined in Level II or Level III of ASNT SNT-TC-1A (including applicable supplements). Level-I personnel may be used if they are given written acceptance/rejection criteria prepared by Level-II or Level-III personnel. In addition, all Level-I personnel shall be under the direct supervision of Level-II or Level-III personnel.

8.3.2.5 Acceptance standards shall be agreed upon by the Purchaser and the Manufacturer. By agreement, welds examined by ultrasonic examination in accordance with 8.3.2 may be judged as acceptable or unacceptable by the standards of Appendix 12, Paragraph 12-3 in Section VIII, Division 1 of the ASME Code. A record of the examination and acceptance shall be prepared.
Contact: Jim Strunk - 412-295-8224 - Email jim.strunk@tfwarren.com

Purpose: Clarify and change the application of UT for tank butt-welds.

Rationale: Furthers the application and understanding on the use of UT. UT in accordance with ASME Section V, App 4 and accept in accordance with ASME Section VIII, Appendix 12 yields a workmanship acceptance standard like the workmanship standard for RT. UT to ASME Section V, Appendix 4, with acceptance to ASME Section VIII, Div. 1, Appendix 12 should be an acceptable alternative for RT.

Source: Disagreements between Purchasers, Manufacturers and Jurisdictions

Impact: Resolution of issues and Safer and more economical process

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**Appendix T – add the underscore as in the table below.**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>RT</td>
<td>Shell plate butt welds unless examined by UT with Purchaser approval. RT is not required for Annex A, J, and S tanks where the Joint Efficiency of 0.7 is used.</td>
<td>7.3.2.1, 8.A.5.3, S.4.14.1</td>
</tr>
<tr>
<td>RT</td>
<td>Butt welds of annular plates that are required by 7.5.1 or M.4.1, <strong>unless</strong> examined by UT with Purchaser approval.</td>
<td>8.1.2.9</td>
</tr>
<tr>
<td>RT</td>
<td>Flush-type shell connections: 100 % of all longitudinal butt welds in the nozzle neck and transition piece, if any, and the first circumferential butt weld in the neck closest to the shell, excluding the neck-to-flange weld.</td>
<td>5.7.8.11</td>
</tr>
<tr>
<td>RT</td>
<td>Shell vertical and horizontal welds which have intersecting openings and repads—100 % over weld length 3 times the diameter of the opening.</td>
<td>5.7.3.4</td>
</tr>
<tr>
<td>UT</td>
<td>Shell plate butt-welds ([see 8.1.2.2, 8.1.2.3, and 8.1.2.4]), annular-plate butt-welds ([see 8.1.2.9]), and flush-type connections with butt-welds ([see 5.7.8.11]) if approved by Purchaser.</td>
<td>7.3.2.1, 8.1</td>
</tr>
</tbody>
</table>
API 650 Proposal – Clarify Locations and change UT Method where Ultrasonic Examination Permitted
Rev. 7
Item Number 650-2006               11-20-2013                               Page 4 of 4
Contact:          Jim Strunk - - 412-295-8224 - - Email    jim.strunk@tfwarren.com
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Source:            Disagreements between Purchasers, Manufacturers and Jurisdictions
Impact:           Resolution of issues and Safer and more economical process

REFERENCE _ NOT PART OF THE ACTION.

Section VIII – Division 1 – Appendix 12

12-3 ACCEPTANCE–REJECTION STANDARDS

These Standards shall apply unless other standards are specified for specific applications within this
Division.

Imperfections which produce a response greater than 20% of the reference level shall be investigated to
the extent that the operator can determine the shape, identity, and location of all such imperfections and
evaluate them in terms of the acceptance standards given in (a) and (b) below.

(a) Indications characterized as cracks, lack of fusion, or incomplete penetration are unacceptable
regardless of length.

(b) Other imperfections are unacceptable if the indications exceed the reference level amplitude and have
lengths which exceed:
   (1) 1/4 in. (6 mm) for t up to 3/4 in. (19 mm);
   (2) 1/3t for t from 3/4 in. to 21/4 in. (19 mm to 57 mm);
   (3) 3/4 in. (19 mm) for t over 21/4 in. (57 mm).

where t is the thickness of the weld excluding any allowable reinforcement. For a butt weld joining two
members having different thicknesses at the weld, t is the thinner of these two thicknesses. If a full
penetration weld includes a fillet weld, the thickness of the throat of the fillet shall be included in t.