A clarification is made and a loophole closed by noting that a welder who makes the WPS qualification coupon is simultaneously qualified only if all nick break specimens are found to meet the acceptance criteria even though retesting of additional nick breaks is acceptable for WPS qualification.

6.1 General

The purpose of the welder qualification test is to determine the ability of welders to make sound butt or fillet welds using previously qualified procedures. Before any production welding is performed, welders shall be qualified according to the applicable requirements of 6.2 through 6.8. It is the intent of this standard that a welder who satisfactorily completes the procedure qualification test is a qualified welder, provided the number of test specimens required by 6.5 has been removed, tested, and meet the acceptance criteria of 5.6, for each welder. For the purpose of qualifying the welder who welds a welding procedure qualification coupon, failed nick break specimens may not be replaced by two additional tested nick breaks, even though replacement is allowed for welding procedure qualification testing.

Defined “Segment”. The definition may need to be relocated to the definitions section of the standard. Also, the proposed edits define when segments may be used in lieu of full circumference pipe. The allowance is based on pipe diameter, as noted. There was considerable discussion regarding the smallest diameter for which segments should be allowed in lieu of testing on full circumference pipe. The referenced 12-3/4 inch limit and 20 inch limits seemed reasonable but could be changed by consensus of the subcommittee. Use of segments or plates in qualification appears to be rare and a minimal number of users would likely be affected. The consensus of the participants is that we do not need to or want to allow the use of plates despite that one subcommittee member at the Jan. 2017 meeting expressed a desire to use plates instead of large diameter pipe. A portion of the proposed new language excludes use of segments for pipe not larger than 12 in. but further below there is discussion of whether there is any need for or desire for allowing segments to be used to simulate large diameter branches in single qualification branch welding tests. If we decide there will be no allowance for using segments for branch tests then the underlined portion of the new proposed text will be eliminated.

A welder shall qualify for welding by performing a test on segments of pipe nipples or on full-size pipe nipples, as specified in 6.2.1. A “segment” of a pipe nipple or fitting refers to a piece of base metal consisting of less than a full circumference section of pipe.

*Segments of pipe nipples or fittings shall not be used for a branch weld portion of a multiple qualification tests.*  
*Segments of pipe nipples or fittings shall not be used for butt welds or lap fillet welds in pipe equal to or smaller than 12-3/4 in. OD.*
Defined allowable testing of welders on large pipe by either welding the full circumference or by brother-in-law welding

A welder qualification test may be performed as a butt weld on full-sized pipe nipples with an OD greater than 12-3/4 in. by either:

1) Welding the full circumference when it is permitted by the WPS used for qualification, or;
2) Welding at least one half of the circumference of a pipe nipple
3) Welding a pipe nipple segment representing at least one half of a full circumference
4) One half (1/2) the circumference from 12 o'clock to 6 o'clock position can be used to qualify two welders. The full circumference shall be welded in a brother-in-law configuration using two welders, with each welder welding one half (1/2) the circumference.

For the purpose of this section, brother-in-law welding consists of two welders welding simultaneously on separate sides of a full circumference pipe nipple. Test specimens are removed from each welder's portion of the completed weld. Specimens are not removed from locations where weld beads deposited by one welder overlap weld beads deposited by the other welder.

For options 2, 3, and 4 all the required test specimens required by 6.5 shall be removed from the half welded by each welder.

There was discussion in San Antonio about cutting, layout, and fit-up. A prior interpretation states that use of templates is acceptable. Other stages in weld preparation are not specifically described. The following language is proposed but may not be acceptable by consensus. It applies to single and multiple qualification and is therefore located in this general section.

Templates may be used to assist in the preparation of weld joints. The Company shall decide if welders are required to cut weld bevels. Welders shall fit-up the prepared pipe nipples, fittings or other components in addition to making the test welds.

Provided a new option for a welder to be qualified by having two welders weld on the same joint (each welder makes specific passes and welds less than the full wall thickness) if the welders are using different welding processes, or different direction of travel, or different fill metal groups (except group 1 and 2 are considered the same for this section). This provides additional options for welder qualification that could be advantageous to some operations in which welders only weld some selected passes. An existing interpretation requires each welder to complete the entire thickness of the weld but this proposed change is designed to offer more flexibility to those who use welders who only make specific parts of production welds. An argument was made that welders who do root passes as part of the qualification are better welders but 1104 already allows single qualification on butt joints with backing strip, so we already accept welders who are basically making fill and cap passes as adequate for that application.
When two or more welders are used to fill the joint thickness when each welder uses different welding processes or different filler metal groups (except that for the purpose of this paragraph filler metal group 1 is considered to be equivalent to filler metal group 2) or directions of travel a failed test coupon would cause all welders to be disqualified regardless of the location of the defect(s).

Clarifies what constitutes failure or acceptance for a brother-in-law test weld

For brother-in-law welding failure of a test coupon from one half of the weld circumference does not impact the qualification of the other welder who welded the other half of the weld

Provide a new option for an Annex B welder to make new construction welds using Section 5 procedures without performing additional Section 6 qualification tests. The qualification tests for Annex B are comparable to the testing requirements of Section 6 in terms of coupon type and number. The Annex B welder’s qualification would be limited to the single qualification essential variables as listed in Section 6.2.1

A welder who qualifies as an in-service pipeline welder using Annex B branch connection or fillet weld tests and procedures may make production branch and fillet welds that are not considered to be “in-service welding”. The welder’s qualification to weld on pipe and fittings that are not in service is limited to the applicable range of essential variables described in Section 6.2.2 and will not be determined by the essential variables described in Annex B. Welders shall not be considered to have a Section 6 multiple qualification by combining welds made in accordance with Annex B with welds made in accordance with Section 6

6.2.1 Single Qualification

The following is a clarification that the mainline portion of a branch weld does not have to be a full circumference piece of pipe of fitting

For single qualification tests, segments of pipe nipples representing a main line may be used to qualify the welder to make branch attachments. The segments shall be approximately one half the pipe circumference or greater.

This is a new description for branch weld single qualification test and the allowance for using segments to simulate large diameter branches, although the participants on the calls do not know if this change adds value or is needed since a welder doing a single qualification test could make a test on a 14 or 16 inch diameter branch, for example, and be qualified to do all larger branches. We considered and rejected a provision that failure to meet the acceptance criteria of any of the three segment orientations would be cause to reject all three orientations. In current format, the welder could make branch connection welds in the orientation corresponding to the segment orientation that he passed

The branch shall consist of a full circumference pipe nipple or fitting for branch diameters equal to or less than 12.75 in. OD. When segments of pipe or fitting are used to simulate branches
larger than 12-3/4 inch welded onto fixed horizontal pipe with, branch segments shall be positioned so that welds are produced in either the flat, horizontal, or overhead position. See Table XX for qualified branch positions

Clarification that a welder with a single qualification can weld with WPSs other than the one used for testing, but the essential variables in 6.2.2 must be met by any welding procedure used. Some users have thought that a single qualification only allows the welder to use the same WPS that they used for testing. 

A welder making a single-qualification test for butt welds, branch connections, fillet welds, or other similar configurations shall follow a welding procedure specification (?????).
Changes in the essential variables described in 6.2.2 require requalification of the welder. The welder is not restricted to welding only with the welding procedure followed during qualification testing, but is limited by the essential variables of the qualification.

6.2.2 Scope

Modified essential variables for single qualification as follows:

The first change is intended to allow more flexibility for welders who qualified using multiple processes. For an assumed situation in which the welder uses multiple processes to make a test weld, the first change allows a welder to use the process used for fill and cap to make all weld passes as long as the new weld is made with some type of backing. Discussion at San Antonio included debating these two options and the consensus was not totally clear, but appeared to favor not relying on measurement of deposit thickness: should we limit deposit thickness for single process to 2x root? Or only allow fill+cap process to be used for entire joint with backing and lap fillet weld?

2) a change in the combination of welding processes, unless the welder has qualified on separate qualification tests, using each of the welding processes that are to be used for the combination of welding processes. The welder may make production welds using only the process used for fill and cap passes even if the test weld used a combination of processes. However, backing must be used for butt welds if the only process used in production is different from the process used to make the root pass in the test weld.

The next change clarifies that efforts to stagger starts and stops by starting or stopping at other than top dead center or bottom dead center does not constitute a change in the direction of welding. This is consistent with AWS 3.0 that defines the range of angles that are considered “flat” or “overhead”

b) A change in the direction of weld progression (from vertical up to vertical down or vice versa, or a change from vertical progression to horizontal progression or vice versa). The specified direction of vertical progression is not intended to prevent welders from welding across the top dead center or bottom dead center of a horizontal pipe to avoid stacking starts and stops.

The next change represents an new restriction because the consensus was that for root pass welding in an open root the filler metal classification can influence the welder’s ability to make a good root. It also defines limitations on what filler metal group is usable for what production weld passes when testing is performed with filler metal from more than one group. For example, E6010 root and hot pass then E8010 fill and cap. In support of this proposed change a “pass” is also defined. At San Antonio we decided to eliminate this following edit:

c) A change of filler metal classification from Group 1 or 2 to any other group or from any Group 3 through 9 to Group 1 or 2 (see Table 1). A change of filler metal classification not listed in Table 1 to any other filler metal classification or vice versa. For the root pass of welds made without backing, any change in filler metal classification group. When more than one filler metal group is used in testing, production weld passes are limited to the filler metal group used for that pass in testing. For the purpose of this section a pass is classified as either a root pass, second pass (hot
The following change eliminates the requirement that the header diameter be considered an essential variable for branch connection weld testing during welder single qualification testing.

d) A change from one specified OD group to another. These groups are defined as follows, however, for branch connection welds the header diameter is not an essential variable:

The following change eliminates the requirement that the header thickness be considered an essential variable for branch connection weld testing during welder single qualification testing. The consensus is that only the branch thickness influences the welder.

e) A change from one specified wall thickness group to another. These groups are defined as follows, however, for branch connection welds and lap fillet welds the header thickness is not an essential variable.

The next proposed edit is a new requirement designed to address two things. First, increased flexibility is provided by allowing the welder to make production welds where the wall thickness is up to and including 1.5 x the thickness of the test coupon. This would be beneficial when the test coupon was near the upper end of the thickness limit for the thickness group. For example, a welder who tests on 0.688 wall could now make production welds on 1.03 inch wall instead of being limited to 0.75 inch wall. See the table below included to illustrate examples.
Second, the unique fusion problems associated with short circuiting arc mode of GMAW are recognized and new restrictions are placed on production weld deposit thickness based on the tested thickness of the GMAW weld. This new requirement introduces a new concept in which the tested weld metal thickness (not base metal thickness) would have to be measured. The participants felt it is valuable to get more input from more subcommittee members regarding the challenges and practicality of measuring deposit thickness. Note that ASME section IX already includes requirements related directly to deposit thickness so some weld inspectors already routinely make those determinations. It was noted at San Antonio that the short arc technology has improved so that lack of fusion is less of an issue that it had been and that ASME Section IX is probably moving toward a significant increase in the allowable deposit thickness. There was reluctance among meeting attendees to restrict GMAW in any way other than saying it could only be used for the passes it was used for in qualification testing.

<table>
<thead>
<tr>
<th>Tested thickness</th>
<th>21st edition qualified range</th>
<th>Proposed qualified range as a result of the additional consideration of 1.5x coupon thickness</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.156</td>
<td>&lt;0.188</td>
<td>≤0.234</td>
</tr>
<tr>
<td>0.25</td>
<td>0.188 - 0.75</td>
<td>0.188 - 0.75</td>
</tr>
<tr>
<td>0.5</td>
<td>0.188 - 0.75</td>
<td>0.188 - 0.75</td>
</tr>
<tr>
<td>0.719</td>
<td>0.188 - 0.75</td>
<td>0.188 - 1.08</td>
</tr>
</tbody>
</table>

Clarification of existing content, broken out as a separate line item

f) A change from rolled to fixed position. A welder who qualifies in the fixed position shall also be qualified to perform rolled welds within the essential variables qualified.

The following proposed text is a new limitation placed on production weld branch position depending upon position of branch that was tested. The referenced branch / header ratio of 1.5 was determined by looking at the resulting range of branch diameters that could be welded in production, based on various assumed branch diameters used in testing. A smaller ratio was deemed to be overly restrictive.

g) A welder with a single qualification based on a test consisting of making a branch connection on the side of the header is qualified to make branch connection welds in any position.

A welder with a single qualification based on making a branch connection weld with the branch at the top of a horizontal fixed position header is qualified to make branch connection welds on the top of a header for branches having a branch diameter to header diameter ratio equal to or less than 1.5 times the ratio used in testing.

A welder with a single qualification based on making a branch connection weld with the branch at the bottom of a horizontal fixed position header, is qualified to
make branch connection welds in any position if the tested branch to header diameter ratio is at least 0.75. For smaller ratios the welder is qualified to make branch attachment welds in the overhead and flat position.

Some opinions were also expressed that pre-beveled fittings should not be allowed to be used for testing.

For the purpose of welder qualification the Company shall decide if the welder is allowed to use pre-beveled fittings as branches.

The next proposed edit is a new requirement limiting production weld branch to header diameter ratio and branch size, depending upon what is tested. The idea is to recognize that the single qualification welder’s ability to make branch connections in production is related to both 1) the orientation of the branch in the test and 2) the size of the branch relative to the size of the test header. The objective is to ensure that the production weld orientation includes only the orientations that were included in testing. For example, a small branch on a large header results in all of the weld being essentially the flat position while a size-on-size branch somewhat effectively evaluates welding in the flat, vertical, and overhead positions. A small branch on bottom only evaluates overhead welding. The same branch welded on the side evaluates flat, vertical, and overhead welding. The determine the branches sizes that can be welded in production a production branch diameter that maintains a branch to header diameter ratio of 1.5 x what was tested is proposed. Once again, the ratio of 1.5 was a compromise value that did not seem overly restrictive but which allowed a reasonable range of production weld branch sizes to be made.

For production header diameters that are different from tested header diameters the maximum allowable production weld branch diameter is the smaller of:
1) the qualified branch diameter group or
2) the production header diameter x the tested branch to header ratio.
   i.e., the qualified branch diameter for production welding = 1.5 x (tested branch OD/ tested header OD)

The following table is used to illustrate the new limitations, using various assumed test header and branch diameter ranges, and assuming the production header diameter is the same as the tested header diameter. More examples could be added. The consensus was that a table of examples would be a useful addition to the Section. At San Antonio it was requested that we try to distill this table and description to a limited number of diameter ranges and base the diameters on nominal pipe size...still working on this. Will consult the descriptions in other standards for guidance.

<table>
<thead>
<tr>
<th>Tested Header Diameter (inch)</th>
<th>Tested Branch Diameter (inch)</th>
<th>Maximum Qualified Production Branch OD (inch) when Production Header is Same as Tested Header</th>
</tr>
</thead>
</table>
The following proposed new table below shows new limitations on production branch and header depending upon what orientations were tested, assuming the test header was horizontal. The weld positions (flat, vertical, overhead, etc.) are as defined by AWS 3.0.

**Table YY Qualification Scope for Single Qualification Test Using a Branch Connection on Fixed Horizontal Header**  
*Note 1*

<table>
<thead>
<tr>
<th>Branch Test Position</th>
<th>Branch Dia./Header Diameter Ratio in Test</th>
<th>Qualified Position of Production Weld for Branch (note 2)</th>
<th>Qualified Pipe Angle for Full Circumference Lap Fillet Weld (note 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>&lt;0.3</td>
<td>Flat</td>
<td>75°-90° (flat)</td>
</tr>
<tr>
<td></td>
<td>≥0.3</td>
<td>Flat, Vertical</td>
<td>0°-90°</td>
</tr>
<tr>
<td>Side</td>
<td>All</td>
<td>Flat, vertical, Overhead</td>
<td>0°-90°</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Bottom</td>
<td>&lt;0.75</td>
<td>Overhead, Flat</td>
<td>75°-90° (overhead)</td>
</tr>
<tr>
<td></td>
<td>≥0.75</td>
<td>Flat, vertical, Overhead</td>
<td>0°-90°</td>
</tr>
</tbody>
</table>

Note 1: This table does not negate or supercede the limitations of the diameter groupings

Note 2: Flat = 0° to approximately 15° (approximately 12:00 to 12:30 o’clock)
Vertica l= Approximately 15° to approximately 105° (approximately 12:30 to 3:30 o’clock)
Overhead = Approximately 105° to 180° (approximately 3:30 to 6:00 o’clock)
Note 3: 0° = horizontal, 90° = vertical pipe

The following is the same as prior content, just broken out as a separate line item

   i) Elimination of a backing strip or weld metal backing

The following proposed new requirement provides specific limitations on welders who do not weld the entire thickness of a test coupon using a single process. The proposed limitations are comparable to provisions in ASME Section IX. At San Antonio the question was raised about what to do if two different processes were used for fill passes in a single joint. I propose the new text in green

   j) A change in the passes welded by a single process when more than one process is used to complete the joint. In production welding the total deposited weld metal thickness for those qualified passes shall not exceed the lesser of twice the test deposit thickness or the maximum base metal thickness allowed in 6.2.2 (e). If two different welding processes are used for fill passes in a single qualification test weld then the welder is qualified to use either of the two processes for fill passes in production welds.

6.3 Multiple Qualification

6.3.1 General

The following proposed edit addresses two things that were not clearly spelled out in the existing test. First, the two tests can be given in any sequence. Secondly, both test welds must be made using the same processes and filler metal groups.

For multiple qualification, a welder shall successfully complete the two tests described below, using qualified procedures. Both test welds shall be welded using the same process or combination of processes and the same filler metal group or groups. The two tests may be given in any order.

The following addresses a clarified allowance for the brother-in-law welding of the butt weld

When a welder qualification test is performed as a butt weld on full-sized pipe nipples or fittings with an OD greater than 12-3/4 in. either:
1) full circumference shall be welded by a welder when it is allowed by the WPS used for qualification, or;

2) Welding at least one half of the circumference of a pipe nipple

3) Welding a pipe nipple segment representing at least one half of a full circumference

4) one half (1/2) the circumference from 12 o’clock to 6 o’clock position can be used to qualify two welders. The full circumference shall be welded in a brother-in-law configuration using two welders, with each welder welding one half (1/2) the circumference.

For the purpose of this section Brother-in-law welding consists of two welders welding simultaneously on separate sides of a full circumference pipe nipple. Test specimens are removed from each welder’s portion of the completed weld. Specimens are not removed from locations where weld beads deposited by one welder overlap weld beads deposited by the other welder.

For options 2, 3 and 4 all the required test specimens required by 6.5 shall be removed from the half-welded by each welder.

The following proposed edit changes (reduces) the minimum allowable diameter for the branch test. The consensus of the Task Group was than smaller diameters can be more difficult to weld than large diameters and this smaller size limit is more consistent with ASME Section IX options

For the other test, the welder shall lay out, cut, fit, and weld a branch-on-pipe connection in which the specified diameters of the run and the branch pipes are equal. This test shall be performed with a pipe diameter of at least 2.375 inch and with a specified wall thickness of at least 0.250 in. (6.4 mm). When small diameter pipe is used for testing more than one test weld may be required to obtain the required number of test specimens.

The following proposed edit provides opportunity for an option to test welders using pipe samples with accelerated cooling, similar to Annex B requirements. The consensus was that making the Annex B type of test weld is at least as difficult as making the standard Section 6 test weld. However, some expressed the concern about whether a welder who qualifies on accelerated cooling test set-up will burnthrough on thin pipe in air. However, Annex B already allows a welder who qualifies on water cooled pipe to make similar welds on pipe with zero flow and containing only a few psi of gas. The burnthrough considerations are the same. Annex B is proposing to allow Annex B welders to do the equivalent of a multiple qualification test by making a size on size branch weld without a hole being cut in the header. The additional text also clarifies that the welder is allowed to use templates or hand-operated mechanisms to do the torch cutting.

A hole with specified diameter approximately equal to the inside diameter (ID) of the branch pipe shall be cut in the run. Alternatively, for welders who will make welds on in-service piping and/or new production welds, the weld is completed with accelerated cooling and no hole is cut in the pipe prior to welding.

The company shall decide if... Welder must cut. Compare with single qual
Templates may be used to assist in layout. Manually operated mechanisms that assist in accurate cutting may be used to cut the hole or to prepare the branch bevel.

The following proposed edit provides an option to make the branch weld oriented either vertically down or at the side. The consensus was that a size on size branch coming off the side of a horizontal header adequately evaluates the welder’s ability to make welds in all orientations.

The weld shall be made with the run pipe axis horizontal and the branch pipe axis extending either vertically downward from the run pipe or projecting from the side of a fixed horizontal position header.

6.3.2 Scope

The proposed edit clarifies limitations on the processes and filler metal groups that may be used in production welding.

A welder who has successfully completed the butt weld qualification test described in 6.3.1 on pipe with an OD greater than or equal to 12.750 in. (323.9 mm) and a branch weld with pipe and branch having specified ODs greater than or equal to 12.750 in. (323.9 mm) in which the specified diameters of the run and branch pipes are equal shall be qualified to weld in all positions; on all wall thicknesses, joint designs, and fittings; and on all pipe diameters using the same process or combination of processes and same filler metal groups a used for the two test welds.

This proposed edit clarifies that if one of the two tests fails to meet the acceptance criteria, the welder may retest by remaking only the failed joint configuration. It is not necessary to repeat both tests.

If only one of the two tests fails to meet the applicable acceptance criteria, the welder may repeat that weld. It is not necessary to repeat both the butt and the branch test weld.

The following is a tabulation of existing requirements to make it easier to see the limits.

<table>
<thead>
<tr>
<th>Weld Type</th>
<th>Diameter Tested</th>
<th>Diameter Qualified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butt and Branch Same Diameter</td>
<td>≥12-3/4, &lt;12-3/4</td>
<td>All, all diameters &lt;12-3/4</td>
</tr>
<tr>
<td>Butt and Branch Different Diameters</td>
<td>Both welds ≥12-3/4, Both welds &lt;12-3/4, One weld &lt;12-3/4</td>
<td>All, all diameters &lt;12-3/4, Each weld joint design subject to all limitations of single qualification testing</td>
</tr>
</tbody>
</table>

The following new illustration clarifies the location of test specimens taken from Brother-in-law test welds.
The following is a repeat of the clarification previously described for single qualification tests

a) 2) a change in the combination of welding processes, unless the welder has qualified on separate qualification tests, each using the same welding process that is used for the combination of welding processes. A welder who qualifies using a combination of welding processes may make production welds using only one process. However, backing [either a backing strip or previously deposited weld metal] must be used for butt welds if the process used in production is different from the process used to make the root pass in the test weld.

The following proposed edit is similar to a limitation previously described for single qualification and now allows welders to make production welds using the same electrode group as used for test weld fill and cover passes if the production weld is made using a backing.

c) A change of filler metal classification from Group 1 or 2 to any other group or from any Group 3 through 9 to Group 1 or 2 (see Table 1). A change of filler metal classification not listed in Table 1 to any other filler metal classification or vice versa. A welder who qualifies with a combination of Group 1 or 2 and Group 3 may also make production welds using only Groups 3 when backing is used for butt welds.

The following proposed edit supports the new capability of qualifying a welder for section 6 welds by using Annex B type of testing. The same concern about whether the welder could make production welds without burnthrough after successfully qualifying on water cooled Annex B test applies here.

d) For branch connection welds, the addition of accelerated cooling if the test was completed without accelerated cooling. Performing the branch connection test on a pipe with accelerated
cooking and no hole cut in the header qualifies the welder to make branch connection welds on new production piping and on in-service piping

6.4 Visual Examination

The following proposed edit attempts to clarify the allowable burnthrough limits. The existing text seemed to have conflicting guidance to burnthrough in multiple qualification tests.

For a butt weld no burn-through (BT) is allowed. Branch connections shall not contain any burn-through (BT) of more than 1/4 in. (6 mm). The sum of the maximum dimensions of separate unrepared BTs in any continuous 12 in. (300 mm) length of branch connection weld shall not exceed 1/2 in. (13 mm).

The following proposed edit supplements the existing visual examination requirements and is considered to be a critical part of workmanship. There is concern about internal undercut limits based on mechanical measurements being excessively conservative and possibly being difficult to meet in testing. Should alternative criteria be used for internal, undercut?

Undercut (internal and external) shall be evaluated to the requirements of Section 9.7 and if any portion of the welders’ qualification weld exceeds the undercut allowed by Table 4, the welder shall be disqualified.

The following new proposed requirement is considered to be a critical component of workmanship and an assessment of the welder’s ability to follow details of a WPS.

All dimensional requirements of the WPS shall be met.

The following proposed edit attempts to clarify who is responsible for defining how many protruding wires is unacceptable.

When semiautomatic welding is used, filler wire protruding into the inside of the pipe shall be kept to a minimum. The Company shall define how much or how many protruding wires are acceptable.

6.5 Destructive testing

6.5.1 Sampling of Test Butt Welds

The following proposed edit clarifies test specimen locations for brother-in-law welding.

To test butt welds, samples shall be cut from each test weld. Figure 12A shows the locations from which the specimens are to be removed if the test weld is a complete circumference weld not performed as a brother-in-law qualification. Figure 12B shows the locations from which the specimens are to be removed if the test weld is completed as a brother-in-law qualification (one half (1/2) circumference welded for each welder qualification).

6.7 Retesting, Disposition of Test Results
The following proposed edit was meant to provide clarification on what happens to a welder qualification status if the test coupon is evaluated using BOTH destructive and NDT methods. There was general agreement that no one should accept a welder as qualified if radiography and mechanical testing are both done and either one of the two shows unacceptable quality. A practical example of this would be, the radiography looks good so the mechanical testing is performed but a nick break samples fails. The company currently is not prohibited from declaring that the radiographic inspection qualified the welder and the nick break was information only. This new language would cause the welder to not be qualified.

*If the Company elects to use both nondestructive tests and destructive tests to evaluate a welder test coupon, failure to meet the acceptance criteria of either test results in failure of the test weld.*

### 6.8 Records

The following proposed edit and related new table attempts to clarify what data is to be recorded in the course of welder qualification testing. Each data field in the table was included because the consensus was that that data element was necessary to show that the welder actually welded within the limits of the WPS.

A record shall be maintained of the tests given to each welder and of the detailed results of each test. *In addition to the results of NDT or destructive test results, the data required for a welder qualification record are listed in Table XX.* *(A form should be developed to suit the needs of the individual company but must be sufficiently detailed to demonstrate that the qualification test met the requirements of this standard and that the welder welded within the parameter ranges specified on the applicable WPS during the qualification test.)* A list of qualified welders and the procedures for which they are qualified shall be maintained. A welder may be required to requalify if a question arises about the welder’s competence.

**Table XX Data Required for Welder Qualification Record**

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Observed Value</th>
<th>Qualified Range for Production Welding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welder name or identification</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Date Welded</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>Date Tested</td>
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<tr>
<td>Process/s</td>
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<tr>
<td>Joint Design</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Position (rolled or fixed, orientation if fixed)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Direction of Welding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe Diameter (if applicable)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pipe Wall Thickness</td>
<td></td>
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<tr>
<td>Branch diameter (if applicable)</td>
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<td></td>
</tr>
<tr>
<td>Segment Dimensions (if applicable)</td>
<td>NA</td>
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<tr>
<td>Butt Weld or Lap Fillet Weld Test Coupon</td>
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<tr>
<td>Thickness</td>
<td>Branch thickness (if applicable)</td>
<td>Time Between Passes (root to second, second to start of remaining passes)</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Electrode or Wire Classification</td>
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<tr>
<td>Electrode or Wire Diameter</td>
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<tr>
<td>Shielding Gas Flow Rate Range</td>
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<td>OFW Flame Characteristic</td>
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<tr>
<td>Amperage Range</td>
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<tr>
<td>Voltage Range</td>
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<tr>
<td>Travel Speed Range</td>
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Section 5.4 – Task Group on Essential Variables

High level summary of activities
Section 5.4 Task Group Summary

• Focused on Essential changes for procedure qualification
• Evolved to include some changes to additional subsections within section five only as a result of the changes to section 5.4
Section 5.4 Task Group Summary

• Definition of essential variable for procedure qualification
  – A welding variable that will affect the mechanical properties of the weld and/or HAZ
  – A variable that will affect crack susceptibility

• Need to be based on what was documented during qualification weld
Section 5.4 Task Group Summary

• Two categories of essential variables
  – Category I for all welding procedures
  – Category II for when toughness and/or hardness are a design consideration

• Table format to present the essential variables
Section 5.4 Task Group Summary

• Big Ticket Changes
  – Base material limited to max SMYS
  – CE
    • was proposed but now suggested as recommendation within another section
  – Base material manufacturing process
    • Was proposed but now removed and will be addressed in a note within the table as a consideration
  – Wall thickness
    • Ranges proposed and discussed. Task group will work to define thickness ranges that are appropriate and acceptable
Section 5.4 Task Group Summary

• Big Ticket Changes
  – Joint design (bevel angles)
    • Was proposed but now removed but will provide definition to a major change
  – Deletion or change of backing material
  – Filler metal
    • Bulk the same but added clarity around sequencing of filler metals
    • Addition to make classification a category II essential variable
  – Shielding gas reference to AWS A5.32
  – Backing gas composition when used
Section 5.4 Task Group Summary

• Big Ticket Changes
  – Electrical Characteristics
    • A change in current/polarity type
    • A change FROM waveform controlled
    • A change ± 20% of heat input recorded during qualification as a category II essential variable
  – Preheat and interpass
    • Split up for clarity
    • New limit for minimum when not applied
  – Addition of deliberate cooling
Section 5.4 Task Group Summary

• Big Ticket Changes
  – Deletion of Post Heating for hydrogen diffusion
  – PWHT
    • Task group to develop guidance based on that which was used during qualification
Section 5.4 Task Group Summary

• Deletions
  – Time between passes
  – Travel speed
    • But provide guidance for what needs to be specified (within 5.3)
  – Direction of welding