PART I: To be Completed by the LANL FWO Welding Program Administrator

A. Code Edition and Addenda:

- [ ] ASME Section IX: Edition: _________________ Addenda: _________________
- [ ] AWS D1.1: Edition: _________________ Addenda: _________________
- [ ] Other Applicable Documents: ________________________________________

B. Base Metal:

1. Material Spec., Type & Grade: _________________ to _________________
2. ASME P-No. and Group: _________________ to _________________
3. Carbon Equivalent: _________________ to _________________
4. Thickness of Weld Test Coupons: _________________ to _________________
5. Diameter (if applicable): _________________ to _________________
6. Type of Backing: ________________________________________
7. Other Requirements: ________________________________________

C. Weld Filler Metal:

1. ASME Specification: Root _________________ Fill _________________
2. AWS Classification: Root _________________ Fill _________________
3. ASME Weld Metal Analysis A No.: Root _________________ Fill _________________
4. ASME Filler Metal Group F No.: Root _________________ Fill _________________
5. Filler Metal Size: Root _________________ Fill _________________

Continued on next page
D. Welding Process and Welding Parameters:

1. Process:
   Root: ___________________________ Number of Passes Over Root: ___________________________
   Fill: ___________________________

2. Shielding Gas: ___________________________ at ___________________________ CFH

3. Back Purge Gas: ___________________________ at ___________________________ CFH
   For Number of Passes __________________________________________
   O₂ Content of Purge Gas Before Welding ___________________________ CO₂

4. Preheat Minimum: ___________________________ °F

5. Interpass Temperature: ___________________________ °F maximum (achieve for at least one pass)

6. Electrical Characteristics: (List By Welding Process)
   Process __________ Current __________ Polarity __________ Transfer Mode __________
   Process __________ Current __________ Polarity __________ Transfer Mode __________

7. Bead Placement Technique: ___________________________

8. Single Pass or Multipass Technique: ___________________________

9. Welding Position to be Tested: ___________________________
   Type of Progression: ___________________________

10. Amperage, Voltage and Travel Speed (per Welding Process and Filler Wire Diameter)

<table>
<thead>
<tr>
<th>Process</th>
<th>Pass</th>
<th>Filler Metal Diameter</th>
<th>Amps (If Pulsed, Give All Parameters)</th>
<th>Volts</th>
<th>Travel Speed (IPM)</th>
<th>Shield Purge/Gas</th>
<th>Cup Size</th>
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11. Joint Design to Use
12. Post Weld Heat Treatment: (PWHT) □ Yes □ No

Temperature: __________________________ °F
Time At Temperature: __________________________ hr
PWHT Procedure To Be Used: __________________________ Rev. __________________________

E. Tests to be Performed:
1. Mechanical Test:
   a. Tensile Tests (QW-150): □ Yes □ No
      Number of Specimens: __________ Type: __________ Per Fig.: __________
      Location of Specimens: __________________________
      Acceptance Per: __________________________ psi
   b. Bend Tests (QW-160): □ Yes □ No
      Number of Side Bend Specimens: __________ Per Fig.: __________
      Number of Face and Root Bend Specimens: __________ Per Fig.: __________
      Location of Specimens: __________________________
      Acceptance Per: __________________________
   c. Toughness Tests (QW-170):
      (Charpy V-Notch) □ Yes □ No
      Test Temperature: __________________________ °F
      Number of Specimens: Base Metal: __________ Weld Metal: __________ HAZ: __________
      Location of Specimens: __________________________
      Per Figure: __________________________
      Minimum Acceptance: __________ Ft-Lbs __________ Mils Lateral Expansion
2. Metallographic Tests
   a. Macro Etch Section Tests: □ Yes □ No
      Number of Specimens: __________________________
      Inspected at: __________________________ % magnification
      Acceptance Per: __________________________
   b. Hardness Transverse Tests: □ Yes □ No
      Number of Specimens: __________________________
c. Magnetic Verification of Delta-Ferrite Tests:  
   Yes  
   No  

   Number of Specimens: ____________  
   □ In-Process-50% Weld Level  
   □ Completion  

   Acceptance Per: ____________________________  

   d. Sensitization Tests:  
      Yes  
      No  

      No. of Specimens: ____________________________  

      Acceptance Per: ____________________________  

3. Nondestructive Tests:  
   Yes  
   No  

   Radiographic: ____________________________  

   Acceptance Per: ____________________________  

4. Other Required Tests:  
   ____________________________  
   ____________________________  
   ____________________________  

   LANL Welding Program Administrator  
   ______________  
   DATE  
   ______________  

Continued on next page
PART II: To be Completed by the LANL Welding Program Administrator

A. Welder Assigned: ________________________________

B. Start of Welding Date: ____________________________

C. Test Facility: _________________________________

D. Pre-Test Inspection:

1. Material Verification:

<table>
<thead>
<tr>
<th>Item</th>
<th>Specification</th>
<th>Manufacturer (Trade Name)</th>
<th>Heat/Lot No.</th>
<th>Carbon Equivalent</th>
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<tbody>
<tr>
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<td>Purge Gas</td>
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<td>Shielding Gas</td>
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2. Type of Coupon:   □ Pipe  □ Plate

3. Pipe OD: _______ Schedule: _______ Thickness: ____________


5. Joints (QW-402):
   Type: ___________________________ Root Opening: ___________________________
   Included Angle: ____________ Root Face:________________________

6. Instrumentation

|---------------------------|------------|-----------------|----------|-----------|-----------------------|----------------------|

Continued on next page
7. Fit-up:  
   - Satisfactory
   - Unsatisfactory

8. Pre-test Cleaning:  
   - Satisfactory
   - Unsatisfactory

Verified By: ____________________________  Date ____________

E. In-process Inspection:
1. Purge: Oxygen Analyzer Reading:______________________________

2. Preheat Temp.: ____________________________

3. Welding Progression:  
   - Uphill
   - Downhill

4. Current Type and Polarity
   - SMAW
     - DCRP
     - DCSP
     - AC
   - GTAW
     - DCRP
     - DCSP
     - AC
   - GMAW
     - DCRP
     - DCSP
     - AC  
     - Transfer Mode: ____________________________
   - FCAW
     - DCRP
     - DCSP
     - AC  
     - Transfer Mode: ____________________________
   - Other:  
     - DCRP
     - DCSP
     - AC

5. Wire Feed Rate for GMAW ____________________________

6. Type of Welding:  
   - Manual
   - Semi-automatic
   - Automatic

7. Verify:
   a. All passes were less than ½ in. Thick:  
      - Yes
      - No
   b. Supplemental filler metals used:  
      - Yes
      - No
   c. Supplementary powdered filler metals used:  
      - Yes
      - No
   d. Root retainers used:  
      - Yes
      - No
   e. Trailing shielding gas used:  
      - Yes
      - No
   f. In-process weld peening used:  
      - Yes
      - No
   g. Rolling direction to weld:  
      - Parallel
      - Perpendicular

8. Initial and interpass cleaning method:______________________________

9. Backgouging performed:  
   - Yes
   - No

Method of backgouging:______________________________

Continued on next page
10. Document weld parameters (for each pass): See Weld Parameter Sheet, Pages 8 and 9
   a. Record on the weld parameter sheet for each pass the welding current information, travel speed, shielding gas information, interpass temperature, and bead placement technique (stringer or weave).
   b. Prepare a sketch on the weld parameter sheet showing the weld joint configuration. Identify each weld pass location and sequence on the sketch.
11. Record the maximum interpass temperature: ________________________________
    At least one pass was completed at the maximum interpass temperature: ☐ Yes ☐ No
12. Post Weld Cleaning: ☐ Satisfactory ☐ Unsatisfactory

Verified By: ________________________________ Date ____________

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<th>Pass</th>
<th>Process</th>
<th>Filler Metal Size</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed</th>
<th>Purge Gas</th>
<th>Purge Flow</th>
<th>Purge O₂%</th>
<th>Shield Gas</th>
<th>Shield Flow</th>
<th>Interpass Temp</th>
<th>Bead Type</th>
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## WELDING PROCEDURE QUALIFICATION TRAVELER

**LANL Welding Program**

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<th>Date</th>
<th>Pass</th>
<th>Process</th>
<th>Filler Metal Size</th>
<th>Amps</th>
<th>Volts</th>
<th>Travel Speed</th>
<th>Purge Gas</th>
<th>Purge Flow</th>
<th>O₂ %</th>
<th>Shield Gas</th>
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<th>Interpass Temp</th>
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**Bead Pattern Sketch**

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**In-process Inspection Complete:**

_____________________________________________  Date  ________________

**PQT No. _____________**

Page 9 of 12
F. Final Inspection:

Visual Inspection:  □ Satisfactory  □ Unsatisfactory

Verified By: _____________________________________________ Date: ____________

G. Post Weld Heat Treatment Time-Temperature: (Attach Recording Chart)

□ Satisfactory  □ Unsatisfactory  □ N/A

Temperature:_________________ °F  Duration:_________________ hours

Verified By: _____________________________________________ Date: ____________

H. Test Specimen Preparation:

Verify the number of test specimens, specimen geometry, size, location, and orientation are documented for the following:

Tensile Tests:  □ Satisfactory  □ Unsatisfactory  □ N/A
Guided Bend Tests:  □ Satisfactory  □ Unsatisfactory  □ N/A
Toughness Tests: (Charpy V-Notch)  □ Satisfactory  □ Unsatisfactory  □ N/A
Macro Etch Section Tests:  □ Satisfactory  □ Unsatisfactory  □ N/A
Other:___________________  □ Satisfactory  □ Unsatisfactory  □ N/A

Verified By: _____________________________________________ Date: ____________

I. Mechanical Test Results:

1. Tensile Tests (QW-150):

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>Dimensions</th>
<th>Area (sq. in.)</th>
<th>Ultimate Total Load (lbs.)</th>
<th>Ultimate Tensile Strength (ksi)</th>
<th>Location and Type of Failure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width</td>
<td>Thickness</td>
<td></td>
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</tbody>
</table>
2. Guided Bend Tests (QW-160):

<table>
<thead>
<tr>
<th>Type and Figure No.</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

3. Toughness Tests (QW-170):

<table>
<thead>
<tr>
<th>Specimen No.</th>
<th>Notch Location</th>
<th>Specimen Size</th>
<th>Test. Temp.</th>
<th>Impact Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(Ft.-Lbs.)</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>% Shear</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td>Mils</td>
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</tbody>
</table>

J. Metallographic Test Results:

1. Macro Etch Section Test Results:
   Inspection Magnification: ____________________________
   Findings: ____________________________

2. Hardness Traverse Test Results:

<table>
<thead>
<tr>
<th>Location</th>
<th>Base Metal</th>
<th>HAZ</th>
<th>Weld Metal</th>
<th>HAZ</th>
<th>Base Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Root</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mid Weld</td>
<td></td>
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</tr>
<tr>
<td>Crown</td>
<td></td>
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</tbody>
</table>

3. Magnetic Verification of Delta-Ferrite Tests Results:
   50% Weld Level: ____________________________
   Completed Weld: ____________________________
4. Sensitization Test Results:

[Blank lines]

K. Nondestructive Tests:

Radiography: □ Accepted □ Rejected

Film Interpreted by: [Signature]

If Rejected, explain problem: [Signature]

L. Other Required Tests:

[Blank lines]

M. Laboratory Test Data and Results Certified Correct:

[Signature] [Signature]

LANL Welding Program Administrator DATE