WELDING PROCEDURE SPECIFICATION

WPS - 3500-D1.8-1  REV. NO.: 0  DATE: 6/18/2008  **APPLICABILITY**

WELDING PROCESS:  FCAW and FCAW  ASME:  AWS: X  OTHER:  AISC 341-05 Demand Crit

SUPPORTING PQR:  3500-D1.8-1- 2G  3500-D1.8-1- 3G  3500-D1.8-1- 4G

**APPLICABILITY**

ASME: AWS: OTHER:

**JOINT**

This WPS shall be used in conjunction with the General Welding Standards (GWS) and Welding Fabrication Procedure (WFP) sections and criteria for joint details, repairs, NDE, inspection etc.

Weld Joint Type: Groove & Fillet Welds  Class:  Full & Partial Penetration

See GWS 1-06 and WFP’s for joint details

Root Opening: 3/16 - 3/8  Backing:  With

Backgrind root: When required  Backing Mat.:  Metal or as specified

Bkgrd Method: Grind or Arc gouge  GTAW Flux: N/A  Backing Retainer: N/A

**FILLER METALS**

AWS Balance:  ASME Balance:  thru

FILLER METALS

Class:  E71T-8-H16  E71T-8-H16

A No:  1  SFA Class:  5.20  5.20  F No:  6  6  Size:  1/16  1/16  1/16  1/16

Weld Metal Thickness Ranges:

Insert: N/A  Insert Desc.: N/A

Flux: Type: N/A  Size: N/A

Welder shall use Lincoln 1/16” Intershield NR-233 wire

AWS Root Pass:  .0125  thru .0250

ASME Root Pass:  thru  99.00

ASME Balance:  thru

**BASE MATERIAL**

P/S No.  Gr No.  to:  P/S No.  Gr No.

Spec.  AWS Group I  to:  Spec.  AWS Group I or II

Grade:  Grade:

Qualified Pipe Dia. Range: ≥  24  ASME:

Qualified Thickness Range:  0.125  thru  99.000  ASME:  thru

**QUALIFIED POSITIONS**

AWS:  All  ASME:  Vert. Prog.:  Vert. Up

Preheat Min. Temp.:  50 °F  GAS: Shielding:  N/A  or  N/A

Interpass Max. Temp.:  550 °F  Gas Composition: / / % / / %

Preheat Maintenance:  50 °F  Gas Flow Rate cfm:  to  to

PWHT: Time @ °F Temp.  N/A  Backing Gas/Comp:  N/A  N/A %

Temp. Range:  °F  Backing Gas Flow cfm:  to

to  °F  Trailing Gas/Comp:  N/A  0 %

APPROVAL: Signatures on file at ENG  DATE:  6/18/2008

WELDING CHARACTERISTICS:

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**WELDING TECHNIQUE:** For fabrication specific requirements such as fittup, cleaning, grinding, PWHT and inspection criteria refer to Volume 2, Welding Fabrication Procedures

**Technique:** Semi-Automtic

**Cleaning Method:** Wire brush, grinder, chipping Hammer

**Stringer or Weave bead (S/W):**

**Oscillation:** 3x

**Forehand or Backhand for GMAW (F/B):** Forehand

**GMAW/FCAW Tube to work distance:** .750 - 1.125

**Travel speed:** Varies

**Gas Cup Size:** N/A

**PROCEDURE QUALIFIED FOR:**

**Charpy "V" Notch:** Yes

**Nil-Ductil Transition Temperature:** No

**Dynamic Tear:** No

**Comments:** This WPS is specifically qualified for Demand Critical welds required by AISC 341-05 & AWS D1.8 Siesmic Welding including qualified for Charpy-V-Notch in weld metal to 24 ftlbs@ -20°F. HAZ +1mm qualified to 38 ftlbs@+50 F°. HAZ +5mm is qualified to 32 ftlbs@ +50 F°.

<table>
<thead>
<tr>
<th>Weld Layer</th>
<th>Manual Process</th>
<th>Filler Metals</th>
<th>Size</th>
<th>Amp Range</th>
<th>Volt Range</th>
<th>Travel/ipm</th>
<th>Nozzle Angle</th>
<th>Other</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>FCAW</td>
<td>E71T-8-H16</td>
<td>1/16</td>
<td>185 to 225</td>
<td>17 to 19</td>
<td>4 to 6</td>
<td>0 to 20</td>
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<tr>
<td>2</td>
<td>FCAW</td>
<td>E71T-8-H16</td>
<td>1/16</td>
<td>205 to 235</td>
<td>18 to 20</td>
<td>5 to 7</td>
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<tr>
<td>3</td>
<td>FCAW</td>
<td>E71T-8-H16</td>
<td>1/16</td>
<td>210 to 255</td>
<td>19 to 20</td>
<td>5 to 7</td>
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<tr>
<td>4</td>
<td>FCAW</td>
<td>E71T-8-H16</td>
<td>1/16</td>
<td>225 to 275</td>
<td>19 to 21</td>
<td>7 to 9</td>
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<tr>
<td>5</td>
<td>FCAW</td>
<td>E71T-8-H16</td>
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REM. *Weld layers are representative only - actual number of passes and layer sequence may vary due to variations in joint design, thickness and fitup.*

Use of LANL Welding Procedures and Welder Qualifications for non-LANL work shall be at the sole risk and responsibility of the Subcontractor, and the Subcontractor shall indemnify and save LANL and the Government harmless from any and all claims, demands, actions or causes of action, and for any expense or loss by reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.