WELDING PROCEDURE SPECIFICATION

WPS - 2010/3006-1/8 **REV. NO.:** 0 **DATE:** 10/5/2004 ****APPLICABILITY****

WELDING PROCESS/ES: GTAW **and** GMAW-SC **ASME:** X **AWS:** X

SUPPORTING PQR: P-WS-167-1 **OTHER:** ANSI

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 **Class:** Full & Partial penetration

See GWS 1-06 for joint details **Preparation:** Mechanical/thermal plasma

Root Opening: 1/16 to 3/32 **Backing:** None

Backgrind root: N/A **Backing Mat.:** N/A

Bkgrd Method: N/A **GTAW Flux:** N/A **Backing Retainer:** N/A

FILLER METALS: **Class:** ER-3xx **and** ER-3xx

A No: 8 **SFA Class:** 5.18 **and** **F No:** 6 **and** **Size:** .035 .093 .125

Insert: EB **Insert Desc.:** "A" Consumable **Weld Metal Thickness Range:**

Flux: Type: N/A **Size:** N/A **AWS:** 0.062 **thru** 1.250

Filler Metal Note: ER-308/ER-309/ER-310 **ASME:** 0.062 **thru** 1.250

BASE MATERIALS: **P No.** 1 **Gr No.** 1-2 **to: P No.** 8 **Gr No.** 1-2

Spec. Steel & Steel Alloys **Grade:** All **to: Spec.** Steel & Steel Alloys **Grade:** All

Qualified Pipe Dia Range: = : 2.5

Qualified Thickness Range: **AWS:** 0.062 **thru** 1.250 **ASME:** 0.187 **thru** 1.250

QUALIFIED POSITIONS: All All **Vertical Progression:** V-UP

Preheat Min. Temp.: 50 **°F** **GAS: Shielding:** Argon GTA **or** A/He/CO2 GMA

Interpass Max. Temp.: 350 **°F** **Gas Composition:** 90 **%** 7.5 **%** 2.5 **%**

Preheat Maintinance: 50 **°F** **Gas Flow Rate cfh:** 10 **to** 25

Backing Gas/Comp: Argon 100 **%**

PWHT: Time @ °F Temp. N/A **Backing Gas Flow cfh:** 3 **to** 8

Temp. Range: N/A **°F** **to** N/A **°F** **Trailing Gas/Comp:** N/A **%**

PREPARED BY: KG Fellers **DATE:** 10/5/2004

Signature on file at FWO-DECS

APPROVED BY: Tobin Oruch **DATE:** 10/5/2004

Signature on file at FWO-DECS

Note:For SC/SS/ML-1/ML-2 work, this WPS requires independent review.

WPS NO: 2010/3006-1/8

WELDING CHARACTERISTICS:

Current: DCEN **and** DCEP **Tungsten type:** EWTH-2 **Transfer Mode:** GMA-SC

Ranges: Amps 75 **to** 155 **Pulsing Cycle:** N/A **to** N/A

Volts 20 **to** 28 **Background Current:** N/A

Fuel Gas: N/A **Flame:** N/A **Braze temp. °F** N/A **to** N/A

WELDING TECHNIQUE: **For cleaning, grinding, and inspection criteria refer to Volume 2, Welding Fabrication Procedures**

Technique: GMA Semi-auto **Cleaning Method:** Grind/chip/file

Single Pass or Multi Pass: M **Stringer or Weave bead (S/W):** S/W **Oscillation:** N/A

GMAW Gun Angle °: 5 **to** 15 **Forehand or Backhand for GMAW (F/B):** F

GMAW/FCAW Tube to work distance: 1/4" - 1/2"

Maximum K/J Heat Input: N/A **Travel speed:** GMA 4" - 8" **Gas Cup Size:** 3/8"-5/8"

No single pass shall deposit greater than 1/2" thickness of material.

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: N/A **Nil-Ductil Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: (1) ASME GMA Weld metal thicknes range=.062" thru 8.0". (2) AWS Weld metal thickness range=.062" thru Unlimited. (3) No single pass or bead shall be greater than 1/2" in thickness. (4) AWS Qualified pipe dia. = =4.0". (5) WFPs that may be used:

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzel Angle	Other
1	GTAW	ER-3xx	.035	75 **to** 150	20 **to** 22	N/A **to** N/A	5 - 15	
2	GMAW-SC	ER-3xx	.093	90 **to** 155	26 **to** 28	N/A **to** N/A		
3								
4	GMAW-SC	ER-3xx	.125	**to**	28 **to** 30	N/A **to** N/A		
5								
6								
7								
8								

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.