WELDING PROCEDURE SPECIFICATION

WPS - 3002-HY80 **REV. NO.:** 0 **DATE:** 3/27/2007 ****APPLICABILITY****

WELDING PROCESS: GMAW **and** GMAW **ASME:** X **AWS:** X **OTHER:**

SUPPORTING PQR: 3002-HY80-P

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: Butt/Fillet		**Class:**	Full & Partial Penetration
See GWS 1-06 and WFP's for joint details		**Preparation:**	Thermal/Mechanical
Root Opening: 1/8 - 1/2		**Backing:**	Metal
Backgrind root: Required on double sided welds		**Backing Mat.:**	Mild Steel
Bkgrd Method: Arc, Grind or Machine		**GTAW Flux:** N/A	**Backing Retainer:** N/A

FILLER METALS **Class:** ER100S-1 **and** ER100S-1

A No: 10 **SFA Class:** 5.28 **an** 5.28 **F No:** 6 **an** 6 **Size:** .062 .062 .062 .062

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

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

Filler Metal Note: Also meets Mil-100S-1

Weld Metal Thickness Ranges:

AWS Root Pass:	0.0625	**thru**	0.190
AWS Balance:	0.0625	**thru**	99.99
ASME Root Pass:	0.062	**thru**	0.190
ASME Balance:	0.062	**thru**	8.00

BASE MATERIAL **P/S No.** N/A **Gr No.** **to: P/S No.** N/A **Gr No.**

Spec. Mil-HY80 **Grade:** **to: Spec.** Mil-HY80 **Grade:**

Qualified Pipe Dia. Range: ≥ **AWS:** 24 **ASME:** 0.5

Qualified Thickness Range: **AWS:** 0.125 **thru** 99.990 **ASME:** 0.187 **thru** 8.000

QUALIFIED POSITIONS: **AWS:** 1G **ASME:** 1G, 2G **Vert. Prog.:** N/A

Preheat Min. Temp.:	225 **°F**	**GAS: Shielding:**	Argon/O2	**or**	Argon/O2
Interpass Max. Temp.:	375 **°F**	**Gas Composition:**	98 / 2 / **%**		98 / 2 / **%**
Preheat Maintenance:	225 **°F**	**Gas Flow Rate cfh:**	40 **to** 75		40 **to** 75
PWHT: Time @ °F Temp.	N/A	**Backing Gas/Comp:**	N/A		N/A **%**
Temp. Range:	N/A **°F**	**Backing Gas Flow cfh:**	**to**		
to	N/A **°F**	**Trailing Gas/Comp:**	N/A		0 **%**

APPROVAL: Signatures on file at ENG **DATE:** 3/27/2007

WPS NO: 3002-HY80

WELDING CHARACTERISTICS:

Current: DCEP **and** DCEP **Tungsten Type:** N/A **Transfer Mode:** Spray

Ranges: Amps 270 **to** 435 **Tungsten Dia.:** N/A **Pulsing Cycle:** **to**

Volts 24 **to** 33 **Background Current:**

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

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

Technique: Semi-Automatic **Cleaning Method:** Wire brush, grind, machine

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

GMAW Gun Angle °: 10 **to** 15 **Forehand or Backhand for GMAW (F/B):** Forehand

No Pass >1/2": True **GMAW/FCAW Tube to work distance:** 0.625 - 0.75

Maximum K/J Heat Input: 60K **Travel speed:** 6 to 16 IPM **Gas Cup Size:** 0.750

PROCEDURE QUALIFIED FOR:

Charpy "V" Notch: Yes **Nil-Ductil Transition Temperature:** No **Dynamic Tear:** Yes

Comments: Note 1.) DT qualified with avg. 502 ftlbs @ 0° F. Note 2.) Charpy Impact qualified with avg. 113 ftlbs @ -60°F

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GMAW	ER100S-1	.062	270 **to** 310	24 **to** 26	6 **to** 9	10 **to** 15	
2	GMAW	ER100S-1	.062	300 **to** 330	25 **to** 27	8 **to** 10		
3	GMAW	ER100S-1	.062	340 **to** 360	26 **to** 28	8 **to** 10		
4	GMAW	ER100S-1	.062	360 **to** 380	27 **to** 30	11 **to** 14		
5								
6								

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.