Los Alamos NATIONAL LABORATORY

WELDING PROCEDURE SPECIFICATION

WPS: 3001-xxxx-11B **REV. NO.:** 1 **DATE:** 4/28/2005 ****APPLICABILITY****
WELDING PROCESS: GMAW **and** GMAW **CODE:** AWS **OTHER:**
SUPPORTING PQR: Z-WS-8-G-V Z-WS-8-H

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 & Fillets
See GWS 1-06 and WFP's for joint details. **Preparation:** Mechanical/thermal
Root Opening: 1/16 - 3/16 **Backing:** Strip or ring if used
Backgrind Root: Double sided joints **Backing Mat.:** CS when used
Bkgrd Method: Grind/chip/arc gouge **GTAW Flux:** N/A **Backing Retainer:** N/A

FILLER METALS: **Class:** ER-1xxS-x **and** N/A
A No: 12 **SFA Class:** 5.28 **and** N/A **F No:** 6 **and** N/A **Size:** .035 .045 .062 .062
Insert: N/A **Insert Type:** N/A **Weld Metal Thickness Ranges:**
Flux: **Type:** N/A **Size:** N/A **AWS Root Pass:**
Filler Material Note: Use of .035 OD filler wire requires WPA approval **AWS Balance:** 0.187 **thru** 8
ASME Root Pass:
ASME Balance: 0.187 **thru** 8

BASE MATERIAL:

	P No: 11B	**Gr No.:** All	**to P No.:** 11B	**Gr No.:** All
Spec.: A-517 AS- Plate	**Grade:** **	**to Spec.:** A-517 AS- Plate		**Grade:** **
Qualified Pipe Dia. Range: >=	**AWS:** 0	**ASME:** 0		
Qualified Thickness Range:	**AWS:** 0.187 **thru** 8	**ASME:** 0.187 **thru** 8		

QUALIFIED POSITIONS: **AWS:** All-plate **ASME:** ---------- **Vert. Prog.:** V-UP

Preheat Min. Temp.: 70 **GAS: Shielding:** CO2 **or**
Interpass Max. Temp.: 500 **°F** **Gas Composition:** 100 / 0 / 0 % 0 / 0 / 0 %
Preheat Maintenance: 70 **°F** **Gas Flow Rate cfh:** 25 **to** 40 0 **to** 0
PWHT: Time @ °F Temp.: N/A **Backing Gas/Comp:** None 0 **%**
Temperature Range: N/A **°F to** N/A **°F** **Backing Gas Flow cfh:** 0 **to** 0
Trailing Gas/Comp: None 0 **%**

WELDING CHARACTERISTICS:
Current: DCEP **and** N/A **Tungsten Type:** N/A **Transfer Mode:** Spray
Ranges: **Amps:** 160 **Tungsten Dia.:** **Pulsing Cycle:** N/A **to** N/A
Volts: 20 **Background Current:** N/A
Fuel Gas: N/A **Flame:** N/A **Braze Temp °F:** N/A **to** N/A

WELDING TECHNIQUE: **For fabrication specific requirements such as fitup, cleaning, grinding, PWHT and inspection criteria, refer to Volume 2, Welding Fabrication Procedures.**
Technique: Semi-auto man. **Cleaning Method:** Grind/chip/arc gouge
Single 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:** Forehand
No Pass > 1/2": **GMAW/FCAW Tube to Work Distance (in):** 1/2 - 5/8
Maximum K/J Heat Input: N/A **KJ/in** **Travel Speed:** As required **Gas Cup Size:** 1/2 - 3/4

PROCEDURE QUALIFIED FOR:
Charpy "V" Notch: N/A **Nil-Ductile Transition Temperature:** N/A **Dynamic Tear:** N/A

Comments: (1) *IPT and Preheat for material =3/4" = 225 °F min. (2) **Grade #s A,B,E,F,J&P

Weld Layer	Manual Process	Filler Metals	Size	Amp Range	Volt Range	Travel/ipm	Nozzle Angle	Other
1	GMAW	ER-1xxS-x	.035	160 **to** 180	20 **to** 24		5 **to** 15	
2	GMAW	N/A	.045	180 **to** 250	0 **to** 0			
3	GMAW	N/A	.062	250 **to** 300	0 **to** 0			
4	GMAW	N/A	.062	250 **to** 300				

REM. * Weld layers are representative only - actual number pf passes and layer sequence may vary.

ML-1/2 projects or jobs must determine if the supporting documentation for this WPS complies with quality requirements of the project/job.

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 the reason of Subcontractor's and their employees posession and use of LANL procedures and qualifications.

APPROVAL: Signatures on file at ES-FE **DATE:** 4/28/2005