PPPL NONCONFORMANCE REPORT NO: 3655 Open Date 05/31/06

Status 9 - Closed NCR **Trend** 07-Out Of Tolerance

Department NCSX **Division** NCSX Project

Source/Org VENDOR

Item Dwg/Part# NCSX-CSPEC-121-02-06 **Procurement #** S005243-F **Cost Center**

RAP# 3245 **Job Doc #** S005243-F **Vendor** MAJOR TOOL AND MACHINE, INC.

RAP Title Field Period Assembly Component Receipt Inspection

☐ HoldTag Applied

Nonconforming Condition (include requirement(s) violated):

VVSA-1, The attached port to vessel fillet welds (Attachment 1) were found to be undersize in accordance with AWS D1.6 paragraph 6.29.1 and Annex II. All of the undersize areas are where the angle between the port and the vessel is greater than 90°. Annex II of AWS D1.6 requires a larger fillet weld size than indicated on the weld symbol in areas greater than 90° in order to produce a weld of equal strength. Annex II (Attachment 2) and pictures of effected areas (Attachment 3) are also attached. This NCR covers the weld inspection on the vessel only and does not include welds on the individual ports.

Lot Size Recd 0 **Sample Size Insp** 0 ☐ Lot Rejected **# Rejected** 0

Reported By Phelps C **Validated By** Boscoe J **Validated Date** 05/30/06

Disposition: Rework*__ Repair*__ Use As Is*__ Return To Vendor*__ Scrap*___ **Use As Is**

The welds were made to the vendor's procedure, not the drawing (or the weld styles shown in attachment 2). The vendor's procedure calls for the port extension to be slipped through holes bored in the shell and welded via full penetration welds. The weld size is thus a minimum of .375 inches plus any external fillet. The drawing called for the port extension to be welded to the surface of the shell and the hole bored later. [PARA. 2] The vendor performed full penetration welds through the vessel wall, plus reinforcing fillet welds (ref. NCR 19464), rather than the specified full penetration weld through the port wall, with reinforcing fillet welds. This results in the actual welds having a significantly greater effective weld throat than specified. Furthermore, AWS D1.6 paragraph 6.5.1 specifies that there shall be no unspecified welds without approval, likely to preclude the possibility of excessive distortion. The full penetration groove welds on these port have reportedly not caused excesssive distortion; therefore are acceptable to engineering. [PARA.3] The nonconforming condition was that the skewed fillet welds were significantly smaller than the fillet weld sizes specified on the design drawings; skewed fillet welds are required to have their leg sizes adjusted, in accordance with AWS D1.6 Annex II, to assure that the minimum specified effective weld throat is achieved. [PARA. 4] This condition will exist and is acceptable as is on all 3 VVSA segments.

For rework or repair of vendor supplied equipments, fill in information below:

#Hours _____ **$Est Labor** _____ **$G&A** _____

$Material _____ **$Burden** _____ **$Total** _____

Disposition By Viola M **Date** 06/22/06

Supervisor's Concur Nelson B E **Date** 06/29/06

Eng. Dept. Head Concur WIlliams M **Date** 06/29/06

WCO/Other N/A **Date** _____

PQA/QC Mgr Dispos Concur Boscoe J **Date** 07/17/06

QC Field Verification By N/A **Date** _____

Distribution

Cog M. Viola

Insp Phelps C

Proj. Doc Control (when closed)

QC Files

Malsbury J

Boscoe J

Malinowski F

Edwards J

Nelson B

Reiersen W

Williams M

Tyrrell M

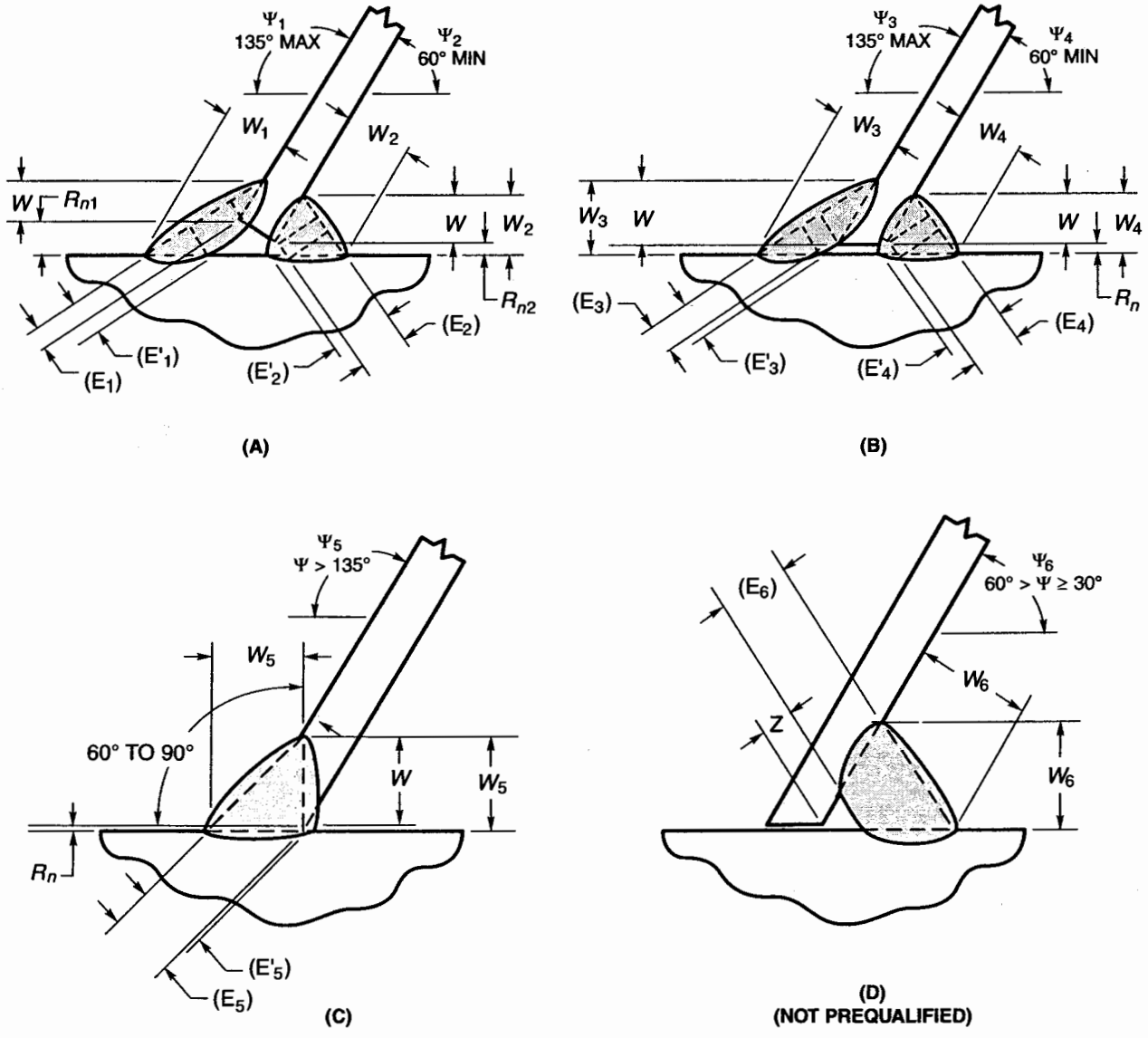
NCR 3655 - Attachment 1

Port to Vessel Fillet Welds

Port No.	Dwg Weld Size	Length of Undersize	Actual Weld Size	Angle Port to Vessel	Annex II Weld Size
9B	3/16"	1 area 5"	1/8"	125°	0.23"
4A	3/16"	1 area 2", 1 area 2.5"	1/8"	1 area 135°, 1 area 125°	0.23" to 0.25"
NB	3/16"	2 areas 2" ea.	1/8"	1 area 135°, 1 area 125°	0.23" to 0.25"
11A	3/16"	1 area 3.5"	1/16"	155°	> 0.25"
11B	3/16"	1 area 3"	1/16"	155°	> 0.25"
10A	3/16"	1 area 3"	1/8"	110°	0.22"
Dome B	3/16"	1 area 2"	1/8"	Not able to measure	> 3/16"

Table II-1
Equivalent Fillet Weld Leg Size Factors for Skewed T-Joints (see Annex II)

Dihedral angle, Ψ	60°	65°	70°	75°	80°	85°	90°	95°
Comparable fillet weld size for same strength	0.71	0.76	0.81	0.86	0.91	0.96	1.00	1.03
Dihedral angle, Ψ	100°	105°	110°	115°	120°	125°	130°	135°
Comparable fillet weld size for same strength	1.08	1.12	1.16	1.19	1.23	1.25	1.28	1.31



Notes:
1. $(E)_{(n)}$, $(E')_{(n)}$ = Effective throat dependent on magnitude of root opening (R_n) (see 5.4.1). (n) represents 1 through 5.
2. t = thickness of thinner part.
3. Not prequalified for gas metal arc welding using short circuiting transfer.

Figure II-1—Details for Skewed T-Joints[1,2,3] (see 2.17)

VVSA-1 Undersize fillet weld areas – port to vessel welds – 5/30/06


IBT


qB


DB

4A-1

4A-2


NB-1


NB-2