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25 January 2005

Ms. Teresa Hubbard
Major Tool & Machine, Inc.
1458 E. 19th Street
Indianapolis, IN 46218

SUBJECT: **Specification Addendum Letter No. 3-3** to Subcontract S005243-F's NCSX Product Specification for Vacuum Vessel System Sub-Assembly NCSX-CSPEC-121-02-03

Dear Ms. Hubbard:

National Compact Stellarator Experiment (NCSX) Project PRODUCT SPECIFICATION FOR THE VACUUM VESSEL SYSTEM SUB-ASSEMBLY, NCSX-CSPEC-121-02-03 (Revision 3), dated 24 November 2004, effective 30 November 2004, was incorporated into Subcontract S005243-F in its Amendment No. 1.

In the interest of clarity and immediate communication to MTM of NCSX Project comments on MTM requests and recommendations that will either directly or indirectly impact on the Subcontract Specification and or drawings, the Project will issue periodically, as appropriate, serial numbered Specification Addendum Letters. Specification and drawing errors or omissions identified by the NCSX Project and the Project "fix" will also be addressed in these letters.]

This **Specification Addendum No. 3-3** (third Addendum to Revision 3 of the Specification) provides the following information reported by NCSX Project Management. This information is effective immediately and where appropriate will be formally incorporated in the next revision of the Specification, now projected to be issued before 1 March 2005.

1. Re: D. McCorkle communication to M. Viola Fri 12/17/2004 5:27 P.M. "Risk mitigation synopsis, and three design change recommendation sketches."

a. Specification Addendum 3-2 provided NCSX project guidance that the greater risk is if the vessel is oversize vs. undersize in the region of the large ports and that Option #1 as proposed, appeared to be the better choice given the scenario provided. Sketches were provided to PPPL for evaluation of a slight modification to the weld joint design where the large ports attach to the vessel which could reduce the anticipated inward distortion by approximately 50%. MTM highly recommended the implementation of these changes. The proposed weld design change for the large ports has been evaluated and deemed acceptable. The three proposed weld detail changes will be included as alternate weld details in the next drawing revisions to SE120-004, sheets 5, 13, and 15. These are expected to accompany Specification Revision 4, projected to be issued before 1 March 2005.

b. Also in the D. McCorkle communication to M. Viola was a handwritten note questioning the callout for the port 4 seal on drawing SE120-004 Sheet 5 of 19 R1 "#43 should possibly be #53." The callout is correct as #43, a Viton seal.

c. In his synopsis, Mr. McCorkle indicated that MTM believes the welding of the large ports will create additional localized inward distortion within the general area of each port. He further stated that it is anticipated that this localized inward distortion at each port extension will gradually improve as you move away from the port welds, and return to the normal welded profile (estimating within approximately 4.0" - 8.0").

   Mr. McCorkle listed the expected distortion as follows:

   i. This local distortion is expected to be minimal at the round pipe / tubing ports (estimate 0.06" - 0.08"). NCSX RESPONSE: A local contour tolerance of +3/16 -5/16 within 8" of the round port attachment welds will be acceptable and will be shown on the drawings as a tolerance zone.

   ii. The installation / welding of the spherical dome is expected to experience more distortion (estimating 0.08" - 0.125"). NCSX RESPONSE: A local contour tolerance of +3/16 -5/16 within 8" of the dome port attachment weld will be acceptable and will be shown on the drawings as a tolerance zone.

iii. The installation / welding of the large fabricated ports (made from ½" thick material) is expected to produce the largest amount of local inward distortion (estimate 0.125" -0.250"). NCSX RESPONSE: The regions around the four ports in question (#4A, 4B, 12A, 12B) have been evaluated. Fortunately, the plasma in these regions is sufficiently inboard from the shell. While the original tolerance is preferred to prevent required alterations to components mounted to the inside of the vessel shell, a tolerance deviation of +3/16 -7/16 at the perimeter which returned to the normal shell profile within 8" of the perimeter of the port weld would be acceptable. This will be included as a note on the drawings pertaining to these port weld details in the next revision.

iv. The estimated inward distortion of the Neutral Beam port is expected to be less than the other large fabricated ports (estimate approximately 0.08" - 0.125"). NCSX RESPONSE: A local contour tolerance of +3/16 -5/16 within 8" of the Neutral Beam port attachment welds will be acceptable and will be shown on the drawings as a tolerance zone.

2. During the review of procedure PS-489 Process Specification – Material Procurement Requirements 65678 PPPL NCSX Vacuum Vessel Sub Assembly, it was discovered that the port covers all had pump out ports requiring the use of 316 material and weld wire. The drawings required the pump out ports to accommodate the leak check associated with the original concept of attaching the ports prior to boring the holes. Should Major Tool avail themselves of the option listed in Specification paragraph 3.1.3 to change the sequence which obviates the need for every blank port cover to have a pump out installed, then the pump out provision is at their discretion. The minimum port connection prescribed by Specification paragraph 4.2.1 must be provided.

3. Major Tool requested the final spacer geometry in order to complete their fixturing design. The VV spacer weldment assembly step file (se121-014_asm.stp) and the VV spacer leak check assembly step file (se121-020_asm.stp) have been placed in the production vessel ftp site. The spacer design did not change in the ECN# 4933 revision, posted 24 November 2004. To maintain a complete data set the spacer pdf drawings were placed in the pdf zip file (VV_Prod_pdf_Files_Rev1.zip) but we inadvertently forgot to place the spacer step files in zip file, VV_Prod_step_Rev1b.zip. We will develop a combined data set in the next revision.

If there are any questions pertaining to this matter, I may be contacted at (609) 243-2441, telefax (609) 243-2021, or by e-mail lsutton@pppl.gov.

Regards,

Larry L. Sutton
Senior Subcontract Administrator

Please Sign and Return by Telefax (609) 243-2021

Receipt of **SPECIFICATION ADDENDUM LETTER 3-3** to Subcontract S005243-F's NCSX SPECIFICATION - PRODUCT SPECIFICATION FOR THE VACUUM VESSEL SYSTEM SUB-ASSEMBLY, NCSX-CSPEC-121-02-03, dated 24 November 2004 is acknowledged.

_____ _____
Signature Date

_____
Title

Major Tool & Machine Company
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Indianapolis, IN 46218