

NATIONAL COMPACT STELLARATOR PROJECT

Engineering Change Proposal (ECP)

COVER PAGE

(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)

Originator: Bob Simmons

Date: January 25, 2005

ECP No: 019

ECP Title: VVSA Contract Addenda 3-1, 3-2, and 3-3

Required Reviewers

Required Reviewers for this ECP:

W. Reiersen

ECP Approval Level

Expedited ECP? ☒ Yes ☐ No

Change Level: 3 Project

Approving Official: 3a Expedited ECP - Engineering Manager

Actions

Revise Specification (NCSX-CSPEC-121-02) and identified drawings and models as per the attached VVSA Subcontract S005243-F Addenda Number 3-1 (December 3, 2004), Number 3-2 (December 21, 2004), and Number 3-3 (January 25, 2005) and ECN-4945.

These items should be revised by March 1, 2005.

APPROVALS

(TO BE COMPLETED BY APPROVING OFFICIALS)

| Change Level | Approving Official | Approval? | Signature |
|-----------------------|-------------------------------|---|-----------|
| 3 | NCSX Project Manager | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 3a (Expedited ECP) | NCSX Engineering Manager | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | |
| 2 | NCSX Federal Project Director | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 1 | Associate Director OFES | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| 0 | Under Secretary of Energy | <input type="checkbox"/> Yes <input type="checkbox"/> No | |

NATIONAL COMPACT STELLARATOR PROJECT

Engineering Change Proposal (ECP)

PART I *(TO BE COMPLETED BY ORIGINATOR)*

Originator:

Date:

Overview of Change

Type of ECP: ☒ EXPEDITED ☐ STANDARD

Type of Change: ☒ TECHNICAL ☐ COST ☐ SCHEDULE ☐ EDITORIAL

(Check all that Apply)

Reason for Change: Supplier and PPPL identified several issues requiring clarification and/or revision to expeditiously change the contract documentation to preclude unnecessary delays and cost/schedule growth. These changes were processed in accordance with the NCSX Procedure 002 (NCSX-PROC-002-01) on Configuration Control. This expedited ECP captures those “rapid response” changes.

Impacted WBS Elements: WBS 121

Impacts of Change (Briefly Describe): Subcontract Addenda 3-1, 3-2, and 3-3 (attached) provide the details. ECN 4945 details the changes to the models and drawings. Specification NCSX-CSPEC-121-02 will have to be revised also.

Assessment of Other Options: None. Processing a normal ECP had the potential to adversely impact the technical, cost, and schedule performance of this subcontract.

Attachments:

- VVSA Contract Addendum 3-1
- VVSA Contract Addendum 3-2
- VVSA Contract Addendum 3-3
- ECN-4945

VVSA Contract Addendum 3-1

Princeton University Plasma Physics Laboratory
James Forrestal Campus
P.O. Box CN17
Princeton, N.J. 08543

3 December 2004

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

SUBJECT: **Specification Addendum Letter No. 3-1** to Subcontract S005243-F's NCSX Product Specification for Vacuum Vessel System Sub-Assembly NCSX-CSPEC-121-02-03

Dear Ms. Hubbard:

A copy of NCSX PRODUCT SPECIFICATION FOR THE VACUUM VESSEL SYSTEM SUB-ASSEMBLY, NCSX-CSPEC-121-02-03, dated 24 November 2004, was forwarded to you by letter dated 26 November 2004 with guidance that it was effective for implementation immediately upon receipt.

It is the NCSX Project's intention to update the Specification frequently.

In the interest of clarity and immediate communication to Major Tool of NCSX Project approval or acceptance of Major Tool 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 Letter No. 3-1** (first Addendum letter issued for Revision 3 of the Specification) is the first of the series of letters that will be issued.

Specification and drawing revisions identified in this letter are effective for implementation upon receipt of the letter and will be incorporated into the next revision of the Specification, now projected to be issued about 1 March 2005, and revised drawings.

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The Princeton Technical Representative for Subcontract S005243-F, Michael Viola, reports the following have been accepted / approved by the NCSX Project effective immediately and will be formally incorporated, as appropriate, in the next revision of the Specification and or drawings.

1. Re D. McCorkle communication to M. Viola 11/20/2004 9:23 A.M. On drawing SE122-104 section F-F (zone E4) the "2X .63" dimension from the datum -A- surface to the center of the NPT hole is a two place, untoleranced dimension. This requires a lineal location of the hole to be within +/- 0.010" (no problem). The "2X .125" (x .625 deep) would require a depth tolerance of +/- 0.005". It is dimensioned to the center of the NPT hole and cannot be checked. This type of feature would normally be a dimension something like: 2X Dia. 0.125 break through Dia. 0.25 hole. The .625 depth will not have an inspection record in the data book. NCSX Project response: Three place dimensioning was a ProE default; we will change the "2x .125" dimension to two place. This specific dimension does not require verification.
2. Re: D. McCorkle communication to M. Viola 11/20/2004 10:21 A.M. The holes located by a basic bolt circle radius are toleranced with a true position feature control frame. NCSX Project response: The .271 typical dimension in Drawing SE122-019 zone G4 (Detail X) will be changed to reference only.
3. Vacuum vessel drawings fail to call out the weld detail of the Dome feature. This will be added to the drawings.

ADDITIONAL INFORMATION

The Segmentation Scheme, a deliverable required by Section 5.1.1 of the Subcontract Statement of Work, has been received and accepted by the NCSX Project.

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

VVSA Contract Addendum 3-2

Princeton University Plasma Physics Laboratory
James Forrestal Campus
P.O. Box CN17
Princeton, N.J. 08543

21 December 2004

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

SUBJECT: **Specification Addendum Letter No. 3-2** to Subcontract S005243-F's NCSX Product Specification for Vacuum Vessel System Sub-Assembly NCSX-CSPEC-121-02-03

Dear Ms. Hubbard:

A copy of NCSX PRODUCT SPECIFICATION FOR THE VACUUM VESSEL SYSTEM SUB-ASSEMBLY, NCSX-CSPEC-121-02-03 (Revision 3), dated 24 November 2004, was forwarded to you by letter dated 26 November 2004 with guidance that it was effective for implementation immediately upon receipt. It was also incorporated into Subcontract S005243-F Amendment No. 1, sent on 7 December 2004 to Major Tool & Machine (MTM) for approval and signature.

In the interest of clarity and immediate communication to MTM of NCSX Project approval or acceptance of 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. 3-2** (second Addendum to Revision 3 of the Specification) provides the following information reported by NCSX Project Management. This information is effective immediately and will be formally incorporated, as appropriate, in the next revision of the Specification, now projected to be issued before 1 March 2005.

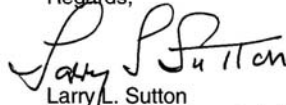
Specification Addendum No. 3-2

1. "The zip file titled VV_Prod_step_Rev1b was added to the production_vessel folder. This file is identical to the Rev 1 Step file posted 24 November 2004 *except* that the assembly Step files have been updated to allow the Step model parts to open with the part names listed with a revision number. Also, included in the zip file is a spread sheet titled VVSA_Revised_Step_Models.xls that lists the revised Step files along with a change description. The earlier posted zip Step file has been archived."
2. Re: D. McCorkle communication to M. Viola Fri 12/17/2004 5:27 P.M. "Risk mitigation synopsis, and three design change recommendation sketches." The NCSX project guidance is that the greater risk is if the vessel is oversized vs. undersized in the region of the large ports. Option #1 as proposed, appears to be the better choice given the scenario provided. The proposed weld design change for the large ports and tolerance deviation located around the perimeters of the large ports must be evaluated. You will receive a response to this proposal by 12 January 2005.

Please acknowledge receipt of this Addendum by signing the receipt on the following page and returning it by telefax.

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

VVSA Contract Addendum 3-3

Princeton University **Plasma Physics Laboratory**
James Forrestal Campus
P.O. Box CN17
Princeton, N.J. 08543

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.

Ms. Teresa Hubbard

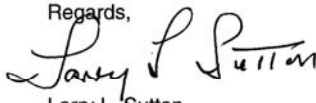
SUBJECT: **Specification Addendum Letter No. 3-3** to Subcontract
S005243-F's NCSX Product Specification for Vacuum
Vessel System Sub-Assembly NCSX-CSPEC-121-02-03

25 January 2005

Page 4 of 4 Pages

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
1458 E. 19th Street
Indianapolis, IN 46218

PPPL ENGINEERING CHANGE NOTICE (ECN) ECN # 4945

| | |
|--|------------------------------|
| COGNIZANT INDIVIDUAL: | Paul Goranson |
| ECN TITLE: Incorporation of changes detailed under Addendum letter 3-1 and 3-3. | |
| ASSOCIATED ECP: 019 | |
| CC/WP/Job: | AREA OR PROJECT: NCSX |

LIMITATION OF SCOPE - NOTE: A Work Planning Form is NOT required if the total change to be accomplished (ENG-032):

- Is not large or complex or does not represent a new installation into a usable space
- Does not have a significant ES&H impact
- Does not involve tritium or other radioactive contaminated or activated equipment
- Does not impact multiple projects, systems, or groups

OR does not change the scope or intent of the original design.

Responsible Line Manager CONCURRENCE: _____
(Signature indicates that no Work Planning form is required.)

If non-concurrence or associated with a work planning form, enter the WP Number: **1096**

| DRAWING(S) AFFECTED NUMBER: | NEW Revision | TITLE |
|--------------------------------|-----------------|---|
| SE122-019 | Rev 2 | Vacuum Vessel Port 12 Seal Retainer |
| SE120-004 | Rev 2 | Vacuum Vessel Period Inspection and Leak Check Assembly |
| SE120-003 | Rev 1 | Vacuum Vessel Period Assembly and Removed Port Extensions |
| SE120-005 | Rev 1 | Vacuum Vessel Port Extension Weldment |
| Continued on Back | | |

DESCRIPTION OF CHANGE: (State Drawing No., Zone/Group, or List Attachments)

Addendum letter 3-1

SE122-104 Relax 0.625" hole depth tolerance to two places, per vendor request.
SE122-019 Change 0.271 typical dimension in zone G4 to reference dimension, per vendor request.
SE120-004, sht 16 Add weld detail to Dome feature.

Addendum letter 3-3

1. SE120-004, shts 5, 13, and 15. Add alternate design port extension weld configuration Option #1 on ports 4 and 12, per request by vendor.
2. SE120-003, sht2. Add note relaxing inward tolerance in zone around Ports 4A, 4B, 12A, and 12B per request by vendor.
3. SE120-005, shts 1-3, SE120-004, sht 9 and sht 19, SE122-104, SE122-112, SE122-149. Add note to drawings to change pumpout ports to optional per vendor discretion.

REASON FOR CHANGE:

To incorporate drawing changes initiated by Addendum 3-1 and 3-3.

ENGINEERING CHANGE PROPOSAL: ECP-019

DATE: 1/25/2005

COGNIZANT INDIVIDUAL MAKING THE CHANGE:



Paul Goranson

Signature of Cognizant Person
Date: 1/25/2005
Time: 10:25:25 AM
ECP-019

RESPONSIBLE LINE MANAGER:



Brad Nelson

Signature signed by Brad Nelson
Date: 1/25/2005
Time: 10:45:00 AM
ECP-019

ECN #4945

| | |
|------------------------------|--|
| COGNIZANT INDIVIDUAL: | Paul Goranson |
| ECN TITLE: | Incorporation of changes detailed under Addendum letter 3-1 and 3-3. |
| ASSOCIATED ECP: | 019 |
| CC/WP/Job: | AREA OR PROJECT: NCSX |

| | |
|------------------------------|--|
| COGNIZANT INDIVIDUAL: | Paul Goranson |
| ECN TITLE: | Incorporation of changes detailed under Addendum letter 3-1 and 3-3. |
| ASSOCIATED ECP: | 019 |
| CC/WP/Job: | AREA OR PROJECT: NCSX |

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[illegible]