

NATIONAL COMPACT STELLARATOR PROJECT

Engineering Change Proposal (ECP)

COVER PAGE

(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)

Originator: Phil Heitzenroeder

Date: June 9, 2005

ECP No: 033

ECP Title: MCWF Technical Requirements Revision

Required Reviewers

Required Reviewers for this ECP:

Dave Williamson, Wayne Reiersen, Brad Nelson, Ron Strykowski, Judy Malsbury, Frank Malinowski, Jerry Levine, Larry Sutton, Bob Simmons

ECP Approval Level

Expedited ECP? Yes No

Change Level: 3 Project

Approving Official: 3 Reg ECP - Project Manager

Actions

- (1) Revise MCWF CSPEC (NCSX-CSPEC-141-03) – will be Revision 8 by June 15, 2005
- (2) Revise MCWF SOW (NCSX-SOW-141-02) – will be Revision 3 by June 15, 2005
- (3) Incorporate ECN-4994 changes by June 15, 2005
- (4) Issue Approved RFD-14-003 by June 15, 2005

APPROVALS

(TO BE COMPLETED BY APPROVING OFFICIALS)

Change Level	Approving Official	Approval?	Signature
3	NCSX Project Manager	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
3a (Expedited ECP)	NCSX Engineering Manager	<input 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	Deputy 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: Phil Heitzenroeder

Date: June 9, 2005

Overview of Change

Type of ECP: EXPEDITED STANDARD

Type of Change: TECHNICAL COST SCHEDULE EDITORIAL

(Check all that Apply)

Reason for Change:

Clarifications of technical requirements, clarification of delivery requirements in SOW, revision of several drawings to reflect redesigned lead block, and approval of a Request for Deviation on material testing.

Impacted WBS Elements: WBS 141

Impacts of Change (Briefly Describe):

This ECP deals entirely with technical changes to requirements that will have no impact on performance, cost, or schedule.

Assessment of Other Options: None

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PART I *(TO BE COMPLETED BY ORIGINATOR)*

Originator: Phil Heitzenroeder

Date: June 9, 2005

Detailed Description of the Change:

(Use Continuation Sheets and/or Attach Information/Sketches, As Needed)

List Attachments, Impacted Documents, etc.

- CSPEC (NCSX-CSPEC-141-03) - Draft A (dated June 10th)
- SOW (NCSX-SOW-141-02) – Draft A (dated June 10th)
- ECN-4994 impacting drawings SE141-114, SE141-115, and SE141-116
- RFD-14-003

Description of Change:

- Changes to CSPEC:
 - In Section 3.1.1.1, a sentence was added cautioning that although the alloy is based on that developed for the prototype, it differs inasmuch as the range of chemistry is now specified. This was requested by EIO, presumably as a note to their personnel. Table 3-2 was added which gives the chemical constituents of the weld wire. These data are from the Metrode product sheets.
 - Table 3-1: The % Si was changed from 0.5 to 0.7% max per EIO's request. The acceptability of this change was confirmed by a June 1st e-mail from Dick Reed: "Phil, There should be no problem with the higher Si (0.7%) spec. Dick"
 - The visual examination requirements of Section 3.1.1.6.1 were revised to eliminate the need to do a higher level of visual examination in the foundry of areas which will then be machined in subsequent steps. The visual examination is now in two distinct steps: one in the foundry and one in the machine shop. For the cast surfaces, Level III is now specified. For machined surfaces, Level II is now specified. It should be noted that machined surfaces are also required to meet a 125 micro-inch surface finish requirement in Section 3.1.1.4, but the visual examination takes into account casting imperfections that are not covered by the machining finish. (We may want to re-examine if this secondary visual examination is needed after we have some experience with it.)
 - In Section 3.2.3.2.3: Iterative weld repairs -i.e., more than 2 at the same location) are now addressed. This was discussed with J. Edwards during our May meeting, and he is in agreement.
 - In Section 4.2.1, the requirements for chemical analysis was clarified ; we want to know analysis of material for *each ladle* rather than a *single average value*, since we cannot be sure of how the material from the three ladles will mix. Consequently, we now clearly say analysis of the material for each ladle is required.
 - To make sure that it is absolutely clear that we expect yield strength, E, ultimate strength, elongation, and Charpy V-notch results from all three zones, the statement : "...for the three zones specified in Section 4.2.2 for each casting..." was added to Sections 4.2.2.1, 4.2.2.2, and 4.2.2.3.
 - Section 4.2.2.4 has been revised to clarify the quantity requirements, their origin, and the need to engrave or stamp so that their location is preserved for the additional test material to be supplied with each casting and for each zone.

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Continuation Sheet:

(Use Continuation Sheets and/or Attach Information/Sketches, As Needed)

- **Changes to CSPEC (continued):**
 - The verification requirements for the weld filler material properties were reworded to clarify their needs. They refer back to the new Table 3.2, since our intention is to see how consistent the chemical composition of the weld wire and material properties. If experience shows that it is reasonable to assess the weld wire properties from its chemistry, we may want to re-assess the need for properties testing of each lot of filler wire.
 - Section 4.2.2 was revised to delete the requirement to test the material in the transverse and longitudinal directions. (See RFD-14-003).

- **Changes to SOW:**
 - Section 5.4.3 revised to clarify the to clarify dimensional inspection file format and contents.

- **Changes to Drawings (per ECN-4994):**
 - Drawings SE141-114, SE141-115, and SE141-116 were revised due to the redesign of the lead blocks. As a result it was necessary to change the slot length from 6.38-in to 7.5-in and the slot width from 1.5-in to 1.5625-in. The location and dimensions of four tee base tapped holes w/ spotface were also changed to conform to the new design. The mounting pad dimensioning scheme was revised, resulting in a slight change in the pad height for the Type -A and -B winding forms.

- **Approval of RFD-14-003**
 - Section 4.2.2 required that material be tested in the transverse and longitudinal directions. This is performed when testing wrought materials, but is typically not performed in cast materials as it offers no significant information. The primary reason is that in cast materials, the grain structure is equiaxed, uniform, and has no directionality. This deviation was approved and the commitment was made to delete this requirement from the CSPEC.