

# NATIONAL COMPACT STELLARATOR PROJECT

## Engineering Change Proposal (ECP)

### COVER PAGE

*(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)*

Originator: Bob Simmons

Date: August 5, 2005

ECP No: 035

ECP Title: Changes to MCWF Technical Requirements

### Required Reviewers

Required Reviewers for this ECP: Dave Williamson, Phil Heitzenroeder, Brad Nelson, Wayne Reiersen, Judy Malsbury, Frank Malinowski, Tom Brown, Jerry Levine, Ron Strykowski

### ECP Approval Level

Expedited ECP? ☐ Yes ☒ No

Change Level: 3 Project

Approving Official: 3a Expedited ECP - Engineering Manager

### Actions

- (1) Update drawings per ECN#5009 by August 10<sup>th</sup>
- (2) Process PPPL fabrication drawing showing stud and hole numbering scheme, new hole locations on casting, and weld nut for attaching the lead blocks by August 30<sup>th</sup>
- (3) Update Specification (NCSX-CSPEC-141-03) by August 10<sup>th</sup>
- (4) Obtain confirmation/quote from supplier by August 20<sup>th</sup>
- (5) Determine cost and schedule impact of adding holes by August 20<sup>th</sup>
- (6) Process/Disposition MetalTek Corrective Action Request #1323 by August 20<sup>th</sup>

### 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)**  
**ECP-035**

**PART I**  
**(TO BE COMPLETED BY ORIGINATOR)**

Originator: Bob Simmons

Date: August 5, 2005

Overview of Change

Type of ECP:      ☐ EXPEDITED      ☒ STANDARD

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

(Check all that Apply)

**Description and Reasons for Changes:**

- (1) Poloidal Break Insulator Re-Design - The original design of the bolt insulators consisted of thick, counterbored G-11 "washers". When MTM machined them from G-11 rod, they cracked due to the fact that the glass plies are now laid up in a stacked fashion rather than in the "jellyroll" fashion as it was when purchased many years ago. PPPL has had similar experience on other projects and concurs with this being a manufacturability issue. Consequently, PPPL proposed that instead of individual insulating washers at each of the 7 bolts, a flat plate that covers the entire surface be used in which 7 holes are provided for the bolts. The glass in this configuration will be in flatwise compression, virtually eliminating the likelihood of cracking. MTM agrees with this design change and notes that they have sufficient material on hand to accomplish this.
- (2) Re-Definition of O-Ring Groove Extent in Machining Models – MTM questioned the need for O-ring grooves in the lead block areas. NCSX reviewed this area, and concurred that the lead blocks will cover the O-ring grooves, rendering them irrelevant. For this reason, they will be omitted from the machining models. The machining models and drawings will be revised to reflect this.
- (3) Elimination of Lead Block Attachment Tapped Holes - MTM noted that, due to geometry, they cannot fit a 90 degree head in to drill and tap the two holes on each side of each "T" which were provided to attach the lead blocks. After consideration of several options, NCSX chose to delete these holes from the machining requirement, and instead just require that MTM locate and scribe (or otherwise clearly mark) the center of each tapped hole. PPPL will weld threaded stainless steel bushings on site to perform the function of the tapped holes that were previously shown. Drawing of lower lead block also will be changed
- (4) Addition of (4) Holes in the Shell of All Three MCWF Types for Coolant Lines - Four clearance holes are being added through the shells of the winding forms in the vicinity of the poloidal break to permit routing of the nitrogen coolant lines. These are new additions; they will be drilled at PPPL.
- (5) Impact of Change in Chemistry Requirements –MetalTek provided a corrective action #1323 dated July 27, 2005, which identified an issue concerning spectrometer measurement errors involving phosphorus and sulfur levels. The corrected values exceeded the specified limit of 0.015% for both P and S as stated in NCSX-CSPEC-141-03, R8. NCSX evaluated EIO's request to raise the limits, and determined that new limits of 0.035% for P and 0.025% for S can be adopted without any impact on performance. Table 3-1 of the CSPEC will be revised accordingly.

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***PART I***  
***(TO BE COMPLETED BY ORIGINATOR)***

**Originator:** Bob Simmons

**Date:** August 5, 2005

**Continuation Sheet**

**Impacted WBS Elements:** WBS 14 (Job 1403)

**Impacts of Change (Briefly Describe):** These proposed changes are not anticipated to have any significant cost or schedule impacts if direction is provided to vendor this week (Week ending August 6<sup>th</sup>). There are no anticipated impacts on performance.

**Assessment of Other Options:** None

**List Attachments, Impacted Documents, etc.**

- (1) Draft of Specification NCSX-CSPEC-141-03-09-dB
- (2) RFD-14-004
- (3) ECN#5009
- (4) MetalTek Corrective Action #1323 dated July 27, 2005
- (5) E-mail from R. Keilbach to P. Heitzenroeder, dated 8/4/05: "MetalTek Zoned Product Analysis Results".