



**Department of Energy**  
**Princeton Site Office**  
P.O. Box 102  
Princeton, New Jersey 08542-0102

August 10, 2005

Dr. G.H. Neilson  
NCSX Project Manager  
Princeton Plasma Physics Laboratory  
P.O. Box 451  
Princeton, NJ 08543

Dear Dr. Neilson:

**SUBJECT: APPROVAL OF NCSX ECP-031, FY2005 DOE DIRECTED  
BASELINE CHANGE PROPOSAL**

Attached is a signed and approved copy of ECP-031 as identified above. The NCSX project cost baseline is now \$92.4M and the completion date is July 31, 2009. It is expected that Earned Value reporting against this baseline will commence with the August, 2005 reporting period.

If there are any questions, I can be reached at 609-243-3713.

Sincerely,

A handwritten signature in black ink, appearing to read "Greg Pitonak".

Greg Pitonak  
DOE Federal Project Director  
for NCSX

cc: R. Simmons, PPPL  
R. Strykowski, PPPL  
D. Lehman, SC 1.3, GTN, HQ  
K. Chao, SC1-3, GTN, HQ  
B. Sullivan, SC 24.2, GTN, HQ  
J. Makiel, PSO

# NATIONAL COMPACT STELLARATOR PROJECT Engineering Change Proposal (ECP)

## COVER PAGE

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

Originator: Ron Strykowski

Date: June 3, 2005

ECP No: 031

ECP Title: FY2005 DOE Directed Baseline Change Proposal

### Required Reviewers

Required Reviewers for this ECP:

WBS Managers, Project Engineers, NCSX QA, ES&H, NCSX Engineering Manager

### ECP Approval Level

Expedited ECP?  Yes  No

Change Level: 0 Deputy Secretary

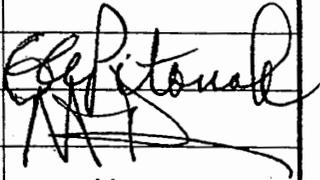
Approving Official: 0 Deputy Secretary

### Actions

(1) Adopt new baseline.

## 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 | Hutch Neilson<br><small>Digitally signed by Hutch Neilson<br/>DN: cn = Hutch Neilson, o = DOE, c = USA<br/>Date: 2005.06.03 08:48:51 -0400</small> |
| 3a<br>(Expedited ECP) | NCSX Engineering Manager      | <input type="checkbox"/> Yes <input type="checkbox"/> No            |  |
| 2                     | NCSX Federal Project Director | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |   |
| 1                     | Associate Director OFES       | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |
| 0                     | Deputy Secretary of Energy    | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |  |

\*\*

\*\* Approved by DOE Deputy Secretary at 7/27/05 ESAAB meeting

# NATIONAL COMPACT STELLARATOR PROJECT

## Engineering Change Proposal (ECP)

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

Originator: Ron Strykowski

Date: April 19, 2005

#### Overview of Change

Type of of ECP:       EXPEDITED       STANDARD

Type of Change:     TECHNICAL     COST     SCHEDULE     EDITORIAL

(Check all that Apply)

Reason for Change: DOE directed rebaseline to reflect revised annual funding guidance.

Impacted WBS Elements: WBS Elements: 12, 13, 14, 15, 16, 17, 18, 19, 2, 3, 4, 5, 6, 7, & 8. In addition, contingency adjusted to reflect added stretch-out costs.

Impacts of Change (Briefly Describe): At DOE direction, NCSX Project rebaselined to support a flat funding profile of \$15.9 peak (FY2006-FY2008). As a result of this direction, the project work is re-scheduled, resulting in a 14-month delay in the project end date (CD-4 milestone), to July, 2009. The impact on the total estimated cost (TEC) is a \$6.1M increase, to \$92.4M, attributed as follows:

- Management stretchout (\$1.2M);
- Job oversight and support stretchout (\$1.2M);
- PPPL allocations stretchout (\$0.4M);
- Escalation \$0.4M
- Rate increases driven by reduced overall funding at PPPL (\$1.6M);
- Contingency associated with the above increases (\$1.2M)
- Defense Contract Management Agency (DCMA) QC service (\$0.075M)

Summary of Level I baseline parameters:

TEC = \$92.4M (Increase of ~\$6.1M)

Project completion date: July, 2009

Budget contingency on work remaining from April 1, 2005: \$12.8M (25%)

Schedule contingency: 5 months

Funding profile (BA in \$M) for the project:

|                         | FY-03 | FY-04 | FY-05 | FY-06 | FY-07 | FY-08 | FY-09 | TEC  |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|------|
| CD-3 Baseline           | 7.9   | 15.9  | 15.9  | 22.1  | 19.4  | 5.1   |       | 86.3 |
| New Baseline (This ECP) | 7.9   | 15.9  | 17.5  | 15.9  | 15.9  | 15.9  | 3.4   | 92.4 |

Assessment of Other Options: None. Directed Change.

# NATIONAL COMPACT STELLARATOR PROJECT

## Engineering Change Proposal (ECP)

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

Originator: Ron Strykowski

Date: April 21, 2005

#### Detailed Description of the Change:

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

List Attachments, Impacted Documents, etc.

- (1) Revised Resource Loaded Baseline
- (2) Update PEP to reflect this data

Description of Change:

The Table Below Summarizes the Cost Impact of this ECP:

| WBS Element   | Previous Baseline<br>(ECP-030)<br>(\$) | Current Baseline<br>(\$) | Change<br>(\$)  |
|---|--|--------------------------|-----------------|
| 12 - Vacuum Vessel                                    | \$9,204K                               | \$9,531K                 | \$327K          |
| 13 - Conventional Coils                               | \$4,552K                               | \$4,790K                 | \$238K          |
| 14 - Modular Coils                                    | \$27,062K                              | \$28,091K                | \$1,029K        |
| 15 - Structures                                       | \$1,381K                               | \$1,413K                 | \$32K           |
| 16 - Coil Services                                    | \$1,036K                               | \$1,140K                 | \$104K          |
| 17 - Cryostat & Base Suppt Structure                  | \$1,321K                               | \$1,361K                 | \$40K           |
| 18 - Field Period Assembly                            | \$5,118K                               | \$5,430K                 | \$312K          |
| 19 - Stellarator Core Mgmt & Integr                   | \$2,421K                               | \$2,752K                 | \$331K          |
| <i>Subtotal WBS 1 - Stellarator Core</i>              | <i>\$52,096K</i>                       | <i>\$54,508K</i>         | <i>\$2,412K</i> |
| <i>WBS 2 - Auxilliary Systems</i>                     | <i>\$778K</i>                          | <i>\$783K</i>            | <i>\$5K</i>     |
| <i>WBS 3 - Diagnostic Systems</i>                     | <i>\$1,117K</i>                        | <i>\$1,143K</i>          | <i>\$26K</i>    |
| <i>WBS 4 - Electrical Power Systems</i>               | <i>\$3,214K</i>                        | <i>\$3,301K</i>          | <i>\$87K</i>    |
| <i>WBS 5 - I&amp;C Systems</i>                        | <i>\$1,915K</i>                        | <i>\$2,050K</i>          | <i>\$134K</i>   |
| <i>WBS 6 - Facility Systems</i>                       | <i>\$674K</i>                          | <i>\$691K</i>            | <i>\$17K</i>    |
| <i>WBS 7 Test Cell Prep &amp; Machine Assy</i>        | <i>\$4,208K</i>                        | <i>\$4,413K</i>          | <i>\$205K</i>   |
| <i>Subtotal WBS 8 - Project Oversight &amp; Suppt</i> | <i>\$9,605K</i>                        | <i>\$11,052K</i>         | <i>\$1,447K</i> |
| <i>Subtotal</i>                                       | <i>\$73,607K</i>                       | <i>\$77,941K</i>         | <i>\$4,334K</i> |
| <i>PPPL Allocations</i>                               | <i>\$1,129K</i>                        | <i>\$1,577K</i>          | <i>\$448K</i>   |
| <i>Contingency</i>                                    | <i>\$11,610K</i>                       | <i>\$12,804K</i>         | <i>\$1,194K</i> |
| <i>DCMA</i>   |  | <i>75k</i>               | <i>75k</i>      |
| <b>TOTALS</b>   | <b>\$86,345K</b>                       | <b>\$92,401K</b>         | <b>\$6,056K</b> |

Overall contingency \$12,804K 25% on the work remaining.

# NATIONAL COMPACT STELLARATOR PROJECT

## Engineering Change Proposal (ECP)

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

Originator: Ron Strykowski

Date: April 21, 2005

#### Continuation Sheet:

The Table Below Summarizes the Schedule Impact of this ECP:

|                 |   | <u>CD-3<br/>Baseline</u> | <u>New<br/>Baseline</u> | <u>Actual</u> |
|-----------------|---|--------------------------|-------------------------|---------------|
| <u>Level I</u>  | CD-1  | May-2003                 |                         | May-2003      |
|                 | CD-2  | Feb-2004                 |                         | Feb-2004      |
|                 | CD-3  | Sep-2004                 |                         | Oct-2004      |
| <u>Level II</u> | Vacuum Vessel & Modular Coil Prel Dsn Rvw                 | Oct-2003                 |                         | Oct-2003      |
|                 | Performance Baseline Review                               | Nov-2003                 |                         | Nov-2003      |
|                 | Conduct VVSA FDR  | Jul-2004                 |                         | May-2004      |
|                 | Mod Coil Winding Form Final Design Review                 | Jul-2004                 |                         | May-2004      |
|                 | Award MC Conductor Contract                               | Dec-2004                 |                         | Oct-2004      |
|                 | Award VV Production Vendor                                | Oct-2004                 |                         | Sep-2004      |
|                 | Award MCWF Mfg Contract                                   | Oct-2004                 |                         | Sep-2004      |
|                 | First MCWF Delivered                                      | Jul-2005                 | Jul-2005                |               |
|                 | Begin TF Coil fabrication activities                      | Jul-2005                 | Sep-2005                |               |
|                 | Complete First Mod Coil Fabrication                       | Feb-2006                 | Mar-2006                |               |
|                 | Vacuum Vessel Sectors Delivered                           | Feb-2006                 | May-2006                |               |
|                 | Last MCWF Delivered                                       | Dec-2006                 | Jun-2007                |               |
|                 | PF Coils Awarded  | Jan-2007                 | Mar-2008                |               |
|                 | Begin Assembly of First Field Period                      | Mar-2007                 | Jul-2007                |               |
|                 | All TF Coils Delivered                                    | May-2007                 | Aug-2008                |               |
|                 | Last Field Period Assembled                               | Sep-2007                 | Nov-2008                |               |
|                 | Begin Vac Vsl Pumpdown                                    | Nov-2007                 | Feb-2009                |               |
|                 | Begin Cryostat Installation                               | Jan-2008                 | Apr-2009                |               |
|                 | Operational Readiness                                     | Mar-2008                 | Jun-2009                |               |
|                 | Begin Start-up Testing                                    | Mar-2008                 | Jun-2009                |               |
|                 | CD-4  | May-2008                 | Jul-2009                |               |
| <u>Joule</u>    | FY04 JOULE #1-Authorize Prototype Fab                     | Dec-2003                 |                         | Oct-2003      |
|                 | FY04 JOULE #2-Begin winding on 3D surface                 | Mar-2004                 |                         | Jan-2004      |
|                 | FY04 JOULE #3-Prototype Casting Ready for Machining       | Jun-2004                 |                         | May-2004      |
|                 | FY04 JOULE #4 - CD-3 Readiness                            | Sep-2004                 |                         | Sep-2004      |
|                 | FY05 JOULE #1- VVSA, MCWF and MC Copper Conductor Awarded | Dec-2004                 |                         | Oct-2004      |
|                 | FY05 JOULE #2- Cmplt Assy of twisted racetrack            | Mar-2005                 |                         | Mar-2005      |
|                 | FY05 JOULE #3- Mod Coil Winding Type C FDR                | Jun-2005                 | Jun-2005                |               |
|                 | FY05 JOULE #4- Complete Winding First MC                  | Sep-2005                 | Sep-2005                |               |