

NATIONAL COMPACT STELLARATOR PROJECT

Engineering Change Proposal (ECP)

COVER PAGE

(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)

Originator: W. Reiersen

Date: November 19, 2004

ECP No: 018

ECP Title: FY2005 Re-planning

Required Reviewers

Required Reviewers for this ECP:

Neilson, Zarnstorff, Reiersen, Heitzenroeder, Viola, Williamson, Goranson, Kalish, Nelson, Brown, Cole, Chrzanowski, Dudek, Johnson, Ramakrishnan, Perry, Malsbury, Levine

ECP Approval Level

Expedited ECP? ☐ Yes ☒ No

Change Level: 2 Federal Project Director

Approving Official: 2 Federal Project Director

Note: Change is a Level 2 because it requires use of contingency funds

Actions

1. Update TF Design Description (Kalish, 12/04)
2. Update Field Period Assembly Plan (Brown, 1/05)
3. Update Final Assembly Plan (Brown, 1/05)

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 checked="" 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	

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PART I *(TO BE COMPLETED BY ORIGINATOR)*

Originator: W. Reiersen

Date: November 19, 2004

Overview of Change

Type of ECP: ☐ EXPEDITED ☒ STANDARD

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

(Check all that Apply)

Reason for Change: To replan forward remaining work scope (including previously reported uncompleted tasks) and strategically re-estimate scope based upon the current evolution of design. This is necessary to ensure consistency with FY2005 funding guidance and to establish near term manpower plans. No changes are proposed to level I or II milestones. No changes are proposed to the CD-4 deliverables. No changes are proposed to the annual funding levels including the TEC of \$86.3M. This re-planning needs to be incorporated into a revised Resource Loaded Schedule (RLS). In addition, there are areas where [1] cost and schedule have been re-estimated; and [2] technical changes have been made which have cost and schedule impacts.

Impacted WBS Elements: 12-Vacuum Vessel, 13-Conventional Coils, 14-Modular Coils, 15 – Structures, 18-Field Period Assembly, 19-Stellarator Core Management and Integration, 3Diagnostics, 4Power Systems, 5-Central I&C, 7Test Cell Preparations and Machine Assembly, and 8-Project Oversight and Support

Impacts of Change (Briefly Describe): The impacts of the changes are that:

1. The RLS has adequate detail in FY05 for earned value reporting
2. Improved cost and schedule estimates for all work packages have been incorporated into the RLS including the effects of rate changes and schedule optimizations. Major improvements in the cost and schedule estimates for Field Period Assembly (WBS 18) and Final Assembly (WBS 75) are reflected in the proposed baseline.
3. Cost and schedule impacts for a re-designed TF coil are reflected in the proposed baseline. The new TF design eliminates the need to machine the nose of the winding after coil fabrication resulting in reduced risk of chip inclusion in the insulation and improved reliability. The Level 2 milestone for award of the TF coil contract has been slipped from July 2005 to October 2005 with no impact on critical path milestones.
4. The new estimates include both increases and decreases at the job level, but a net increase overall. Therefore, this change requires use of \$402K in contingency funds.

Assessment of Other Options:

1. No other options exist for improving the level of detail in the RLS for FY05 and incorporating our best cost and schedule estimates.
2. The change in the TF design was motivated by a desire to minimize the risks associated with machining the nose of the winding. Not adopting that change would have resulted in higher technical risk.
3. Periodically updating the estimates for all remaining work is necessary to surface and resolve latent issues before they materialize. Failure to do so would increase cost and schedule risks. It is most efficiently done in conjunction with the detailed planning at the start of a fiscal year.

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Detailed Description of the Change:

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

List Attachments, Impacted Documents, etc.

Attachments

1. Reconciliation Table of Costs by WBS
2. Revised Resource Loaded Schedule

Impacted Documents

1. TF Design Description
2. Field Period Assembly Plan
3. Final Assembly Plan

Description of Change: Revised Resource Loaded Schedule and Reconciliation Table attached. Table below provides a summary description of changes by WBS.

	ECP-016 Baseline	ECP-018 Baseline	Delta		
1. Stellarator Core	49,976.9	50,655.9	+679.0	+1.4%	
11 Limiters	0.1	0.1	+0.0	+0.0%	
12 Vacuum Vessel	8,546.0	8,737.4	+191.4	+2.2%	Weld joint test sample, VVSA oversight, lateral supports.
13 Conventional coils	4,103.7	4,441.1	+337.4	+8.2%	Re-estimate of new design.
14 Modular Coils	25,794.1	26,200.4	+406.3	+1.6%	MCWF Prototypes, Title III, & Analysis; TRC oversight
15 Coil Structures	1,447.8	1,380.7	-67.1	-4.6%	Re-estimate/reallocate design labor.
16 Coil Services	1,036.9	1,036.0	-0.9	-0.1%	Rates, escalation, etc.
17 Cryostat & Base	1,301.1	1,321.1	+20.0	+1.5%	Rates, escalation, etc.
18 Field Period Assy.	5,065.7	5,118.1	+52.4	+1.0%	Re-estimate design and assembly labor.
19 Stellarator Int. & Mgt.	2,681.5	2,421.0	-260.5	-9.7%	Re-estimate
2. Fueling & Pumping	777.0	778.3	+1.3	+0.2%	Rates, escalation, etc.
3. Diagnostics	1,160.9	1,116.7	-44.2	-3.8%	Eliminated double counting of magnetic sensor installation.
4. Power Systems	3,268.1	3,214.1	-54.0	-1.7%	Eliminated 2nd-level outlets; re-estimate/re-allocate budgets
5. Central I&C / Data Acq.	2,188.8	1,915.2	-273.6	-12.5%	Re-estimate design and programming labor.
6. Facility Systems	864.9	825.2	-39.7	-4.6%	Rates, escalation, etc.
7. Test Cell Prep / Machine Assy.	4,274.4	4,207.9	-66.5	-1.6%	Eliminate FY-06 oversight & planning; eliminate platform.
8. Project Mgt. & Integ.	9,396.6	9,450.9	+54.3	+0.6%	Re-estimate
PPPL Allocations	983.3	1,128.6	+145.3	+14.8%	Revised budgets & allocation maps
BCWS	72,890.9	73,292.8	+401.9	+0.6%	Includes \$120k due to rate changes.
 Contingency	 13,455.0	 13,052.9	 -402.1	 -3.0%	
EAC	86,345.9	86,345.7	-0.2	-0.0%	

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Continuation Sheet:

Summary of Estimate Changes

14 Modular Coils	+406.3	MCWF Prototypes, Title III, & Analysis; TRC oversight
13 Conventional coils	+337.4	Re-estimate of new design.
12 Vacuum Vessel	+191.4	Weld joint test sample, VVSA oversight, lateral supports.
PPPL Allocations	+145.3	Revised budgets & allocation maps
18 Field Period Assy.	+52.4	Re-estimate design and assembly labor.
4. Power Systems	-54.0	Eliminated 2nd-level outlets; re-estimate/re-allocate budgets
3. Diagnostics	-44.2	Eliminated double counting of magnetic sensor installation.
15 Coil Structures	-67.1	Re-estimate/reallocate design labor.
7. Test Cell Prep / Machine Assy.	-66.5	De-scoped platform and re-estimated work.
19 & 8 Mgt./Integration	-206.2	Re-estimate
5. Central I&C / Data Acq.	-273.6	Re-estimate design and programming labor.
Other	-19.2	
Total	+401.9	