NATIONAL COMPACT STELLARATOR PROJECT
Engineering Change Proposal (ECP)

COVER PAGE
(TO BE COMPLETED BY SYSTEMS ENGINEERING SUPPORT MANAGER)

Originator: Hutch Neilson	Date: July 30, 2004
ECP No: 04-011	ECP Title: Re-Baseline WBS 14 Modular Coils

Required Reviewers

Required Reviewers for this ECP:
Stellarator Core (WBS 1) Project Engineer, WBS 14 Manager, Project Control Manager

ECP Approval Level

Expedited ECP? ☐ **Yes** ☒ **No**
Change Level: 2 Federal Project Director
Approving Official: 2 Federal Project Director

Actions

(1) **Update technical, cost, and schedule baselines**
(2) **Update WAFs to reflect the new detailed costs and schedules**
(3) **Report status against these revised baselines, starting with the July statusing**
(4) **Apply contingency to previously accomplished work plus future tasks in recognition of increased magnitude of scope. Reset previously reported BCWS and BCWP for jobs 1403, 1404, and 1406 to accurately portray project budgets and revised plans for uncompleted work.**

APPROVALS
(TO BE COMPLETED BY APPROVING OFFICIALS)

Change Level	Approving Official	Approval?	Signature
3	NCSX Project Manager	☒ Yes ☐ No	T.H. Neilson 7/28/04
3a (Expedited ECP)	NCSX Engineering Manager	☐ Yes ☐ No	
2	NCSX Federal Project Director	☒ Yes ☐ No	7/28/04
1	Associate Director OFES	☐ Yes ☐ No	
0	Under Secretary of Energy	☐ Yes ☐ No	

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PART I
(TO BE COMPLETED BY ORIGINATOR)

Originator: Hutch Neilson	**Date: July 30, 2004**

Overview of Change

Type of of ECP: ☐ **EXPEDITED** ☒ **STANDARD**

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

(Check all that Apply)

Reason for Change: WBS 14 Modular Coils is being rebaselined following completion of Title II design of the modular coil winding forms (MCWF) with the release for fabrication of the CAD models, PDF drawings, and specifications on July 20-21, 2004. 1) With the completion of MCWF Title II design, the associated risks are now retired, so it is appropriate to cover the increased cost incurred (variances) in 3 MCWF design and R&D jobs with contingency. 2) The work in WBS 14 from now to the next major critical-path milestone, start of production coil winding, has been planned in greater detail (to Level IV). Changes have been made in detailed schedules and job budgets in order keep the critical path on schedule and provide adequate budget for the planned work scope. Though the work scope has been reduced to the minimum, the estimated costs have increased as a result of detailed planning and better understanding of the design challenges, number of drawings required, fabrication challenges, and testing/analysis needs that has been gained through the work to date.

Impacted WBS Elements: WBS 14 (Modular Coils)

Impacts of Change (Briefly Describe): Cost increases and actual schedule progress driven by MCWF Title II design, now complete, are being covered with $700k of contingency. The performance measurement baseline for future work in WBS 14 is being expanded in detail and revised to be consistent with updated plans. Contingency of $785k is being requested to cover increases in estimates for future work in WBS 14 jobs.

As a result of the above changes, it is proposed to draw down contingency by $1,485K from $14,180K to $12,695K and apply to the performance measurement baseline (PMB).

Assessment of Other Options: The updated plan reflects growth in cost and schedule estimates for certain tasks, but also scope reductions (some already captured in ECP-04-009) and optimizations which keep the critical path on schedule with minimum cost growth. Failure to provide realistic design and R&D budgets based on improved understanding of the difficulties would risk variances in the next phase and would constitute a failure to learn from past problems. Any further reductions in work scope preparatory to winding the production coils would introduce unacceptable cost and schedule risks in the following phase, fabrication of the production modular coils.

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Originator: Hutch Neilson	**Date: July 30, 2004**

Detailed Description of the Change:

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

List Attachments, Impacted Documents, etc.

Attachment 1 – Detailed Breakdown of Cost Impacts
Attachment 2 – Updated Barcharts

Description of Change:

The following items provide details of the WBS 14 jobs affected by this ECP

- Job 1403, Modular Coil Final Design
  - Cost impact:
    - Increased cost to accomplish previously completed work scope associated with completion of MCWF final design deliverables: $358k
    - Increase estimates for future winding details and assembly drawings; additional analysis addressing FDR issues: fracture life and winding pack shear loads: $190k
  - Schedule impact:
    - None. However, re-set the Performance measurement baseline (PMB)'s BCWS and BCWP to accurately reflect this application of contingency.
- Job 1404, Modular Coil Winding Form R&D
  - Cost impact:
    - Reduce budget per latest vendor forecast: –$100k and add +$70k to reflect the actual cost of engineering support required for the MCWF procurement process. Net change= - $30k
  - Schedule impact:
    - Re-set PMB schedule to reflect actual work performed and schedule associated with completion of the MCWF final design deliverables as well as remaining work to be consistent with current forecasts. (Any future work on the MCWF prototypes will support manufacturing planning and estimates, not design.)
- Job 1406, Modular Coil Winding R&D
  - Cost impact:
    - Increased cost to accomplish previously completed work scope (materials properties testing) associated with completion of MCWF final design deliverables: $342k.
    - Increase estimates for future fabrication of twisted racetrack demo coil and additional testing to address FDR issue of winding pack shear: $287k
  - Schedule impact:
    - None. However, re-set the Performance measurement baseline (PMB)'s BCWS and BCWP to accurately reflect this application of contingency.

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Originator: Hutch Neilson	**Date: Draft C1 – July 30, 2004**

Continuation Sheet:

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- Job 1407, Winding Fixtures and Facilities
  - Cost impact:
    - Increase estimates for design, fabrication, installation of fixtures and supports. +$205K.
- Job 1408, Production Materials, Supplies, and Component Fab.
  - Cost impact:
    - Increase estimates due to added complexity for fabrication of clamps, chill plates, and cladding. $216K.
- Job 1410, Prototype winding fabrication. Eliminated from project scope.
  - Cost impact: -$83k