

National Compact Stellerator Experiment Mini Review

WHEN: September 1, 2004

WHERE: Department of Energy, Germantown, Maryland

COMMITTEE: Consisted of five DOE participants and one technical consultant.

1. CURRENT STATUS OF PROJECT:

	Baseline
Total Estimated Cost (MIE)	\$86.3M
Mission Need (CD-0)	May 2001 (Actual)
Preliminary Baseline (CD-1)	November 2002 (Actual)
Performance Baseline (CD-2)	February 2004 (Actual)
Start of Construction (CD-3)	September 2004 (Forecast)
Start of Operations (CD-4)	May 2008 (Forecast)
Percent Complete as of July 30, 2004	20.2% (vs. planned 21.6%)

2. TECHNICAL:

- **NCSX is a unique and challenging project, still at the beginning of pushing the technology on coil windings.**
- Although the issue of finding vendors capable of fabricating the modular coil winding form (MCWF) and Vacuum Vessel Sub Assembly (VVSA) has been resolved, **there still remain numerous risks and uncertainties.** Specifically, there are concerns with **complexities of winding the modular coils and the assembly of the vacuum vessel and the modular coils.**
- **Deferment of activities** such as D-site power supplies connection, neutral beam testing, diagnostic design and port extension, and other work **to the operations phase will not technically impact the ability to achieve** goals needed to demonstrate **CD-4.**
- There is also **very little scope contingency remaining** for the project in case more difficulties are encountered later in the project.
- Finally, the project needs to **insure that the C-site power supplies can achieve conditions needed for mapping.** Specifically configurations that are sensitive to errors may require introduction of certain rotational transform values.

3. COST:

- Based on the proposals received, **there was a \$4.5M increase for awarding the MCWF and VVSA contracts** which will require deferring of activities (see Section 2. Technical, bullet #3 above) and the use of additional contingency funds.
- As a result, the **contingency has been reduced from ~25% to ~22%** of the estimate to complete. Considering the complexity of the project, the **contingency appears low.**
- Since the contracts for the MCWF and VVSA will be fixed price, the project is including **~10% contingency on MCWF and VVSA fabrications.** **This contingency amount also seems low.**
- To ensure that these fabrications stay within budget and to maintain the cost, **controlling the changes to the MCWF and VVSA is essential.**

4. SCHEDULE:

- The **fabrication of the MCWF by the vendor will require five more months** than the planned schedule.

- **To accommodate the delay** in the schedule, **project plans to postpone procurement** of poloidal and toroidal field (PF/TF) coils to later in the project; **accelerate modular coil winding and assembly** by adding an addition line; **perform some activities in parallel, and deferment of activities to operations phase.**
- The latest schedule presented to the committee, which contains approximately 5 months of **float is “success oriented.”**
- However, **the project (~20% complete), still has more difficult work ahead.** Furthermore, because **MCWF and VVSA fabrication is with the vendor,** the lab has little control on the delivery of these essential components.
- Also, **contingency funding is backend loaded thus the project lacks flexibility** with moving activities around.
- The project need to **ensure that activities that will be delayed** (i.e., PF/TF coils) are **not** pushed back too far that they become **critical path items** or interfere with assembly of the components.
- Finally, the committee identified that there may still be some optimization possible with the schedule.

5. FUNDING:

- The current **funding profile is not optimized.** There is inadequate BA in early years which **limits the rate at which work can be completed** and thus has direct impacts on the cost and schedule.

	FY 03	FY 04	FY 05	FY 06	FY 07	FY 08	Totals (\$M)
Budget Authority (BA)	7.9	15.9	15.9	22.1	19.4	5.1	86.3
Budget Outlay w/o Contingency	5.9	14.7	17.9	19.1	14.6	2.1	74.0
Contingency			1.4	3.0	4.9	3	12.3
Total	5.9	14.7	19.0	22.1	19.5	5.1	86.3

6. MANAGEMENT:

- It was evident that the **project team and the Princeton Plasma Physics Laboratory (PPPL) management are very committed to the project.**
- **The project team has also worked very hard to re-plan** and accommodate the significant cost and schedule increases. Thus, little schedule or cost contingency and flexibility is left.
- However, the project must plan for continuous and aggressive cost and schedule optimization since more challenges can be expected as more difficult work are likely in the future.
- The **program office also needs to review and reconsider the funding profile** to minimize the potential impacts of cost and schedule increases later in the project.
- The recent announcement by DOE to locate the US ITER project at PPPL may limit availability of resources for the NCSX project.

7. ACTION ITEMS: None

8. SUMMARY:

Overall, the Committee was concerned with the challenges the project faced including the amount of cost and schedule contingencies available. However, the committee agreed that **the project is ready for CD-3, Start of Construction.**