U.S. DEPARTMENT OF ENERGY

OFFICE OF SCIENCE

Review Closeout for the National Spherical Torus Experiment (NSTX) Upgrade Project

Princeton Plasma Physics Laboratory

February 4, 2014

Review Committee

Kin Chao, DOE/SC, Chairperson

Review Committee

Arnie Kellman, General Atomics
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Observers

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Charge Questions

1. Critical Path Construction Efforts: Does the Project team have a realistic, executable schedule for Center Stack (CS) remaining construction efforts? Yes, but it remains aggressive for the early finish date.

   Does the project have adequate resources and the appropriate skills mix to execute the remainder of the project per the plan? Yes.

2. Baseline Cost and Schedule: Are the current project cost and schedule projections consistent with the approved baseline cost and schedule? Yes

   Is the contingency remaining adequate for the risks that remain? Yes

3. Management: Evaluate the management structure as to its adequacy to deliver the scope within budget and schedule. Are risks being actively managed? Yes—the structure and organization remains the same since the last review.

   Has the project responded satisfactorily to the recommendations from the previous project reviews? Yes—the project responded satisfactorily to all the recommendations.

Project Status

Project Status as of December 31, 2013		
Project Type	MIE	
CD-1	Planned: Dec 2009	Actual: Apr 2010
CD-2	Planned: Dec 2010	Actual: Jan 2011
CD-3	Planned: Jan 2012	Actual: Dec 2011
CD-4	Planned: Sep 2015	Actual: on schedule
TPC Percent Complete	Planned: 84.5%	Actual: 80%
TPC Cost to Date	$71.2M	
TPC Committed to Date	$73.2M	
TPC	$94.3M	
TEC	$83.5M	
Contingency Cost (no Mgmt Reserve)	$5.4M	30 % to go
Contingency Schedule on CD-4	10 months	101%
CPI Cumulative	0.98	
SPI Cumulative	0.94	

Findings

- **The safety record of the project continues to be outstanding with no safety incidents reported to this committee since the last meeting.**
- **TF coil was completed since last review and electrical tests were successfully performed.**
- **First layer of OH has been wound on the Aquapour base with a resulting 240 turns vs planned 226 turns. The radial build is in tolerance. Production in-line braze joints have been successfully performed. Completion of the first layer-to-layer transition is in process.**
- **Learning curve for winding is as expected and has resulted in two shift operation with 4 -man teams carrying out this work.**
- **Both PF1B coils have fabricated and one has been delivered. The tooling for PF1A and PF1C are complete and winding of PF1A is starting.**

Findings

- **Setup and commissioning of winding station took 14 weeks longer than scheduled and it pushed this task into critical path. Overall, 26 days were lost on critical path, but 24 days have been recovered in the schedule by planning for 2nd shift operation on non-winding tasks.**

Comments

- **Project management has satisfactorily responded to all recommendations of the previous review. Risk registry is being updated and actively used as a tool.**
- **OH winding process is proceeding faster than scheduled. This efficiency is being banked to allow for future slippages in OH assembly.**
- **The project continues to demonstrate a high attention to quality, especially in the OH work that this committee was shown. The focus on quality should continue.**
- **The project should continue proactive work planning for all remaining work.**
- **It is of some concern that there is no firm understanding of why there are 14 extra turns in the first layer of 226 turns planned. While the higher number of turns is not a problem for the physics program, it is concerning that this may be pointing to a potentially serious design or fabrication issue and is worth resolving.**

Recommendations

- **None**