PPPL is Committed to the Success of NCSX

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NCSX is Critical to Fusion

- NCSX's mission is critical to having a credible plan for the development of fusion energy. The Compact Stellarator offers unique advantages:
 - Continuous operation, low recirculating power.
 - Disruption-free operation.
 - Compact configuration projecting to attractive Demo.
 - Burning plasma physics transferable from ITER.



Some Lessons Learned: Cost Estimating

- Accurate cost and schedule estimation is like safety. *It has top priority*. This must be communicated from the Director and absorbed throughout the Lab's culture.
- Realistic cost estimates, including estimate uncertainties and risks, must be reviewed by peers and signed off by the work package manager and the full management chain up to the Project Manager and Head of Engineering and Technical Infrastructure.
- Cost and schedule estimate uncertainty and risks must be rolled up from the work package level to provide project cost and schedule contingencies.



Some Lessons Learned: Monitoring, Oversight and Reporting

- Monthly Estimates-to-Complete based on detailed current understanding must be undertaken.
- Risk Register must be reviewed and updated monthly.
- Full *bottoms-up* Estimates-To-Complete are required on a 6-month basis to assure that the implications of earlier activities for later ones are taken fully into account.
- Management oversight and reporting must be much more thorough, so that issues are well understood by all parties.

A systematic lessons-learned review is planned by Princeton.



Engineering & Management Improvements

- Additional engineering support to complete remaining design work
 - PPPL has moved prime engineering resources from NSTX.
 - ORNL has increased engineering resources.
 - Princeton University providing engineer from Physics Department.
 - Discussions with LLNL/NIF about sharing metrology skills.
- Improved Project Management skills
 - Princeton University has engaged Jim Anderson with extensive PM experience, to make immediate changes and improvements on NCSX.
 - Laboratory has initiated a broad search for a long-term PM for NCSX.
 - 45 managers have taken Senior Technical Project Management course, by American Management Association.
 - Plan to strengthen Project Management at PPPL.
 - » Use of external reviewers, especially from other DOE-SC Labs.
 - » Additional training of PPPL personnel
 - » Acquisition of additional skilled project management expertise
 - New Lab-wide Project Management Policies, Procedures and Plans will be adopted, and modifications will be made to existing ones, based on planned lessons-learned review.



Increased Lab Oversight and Monitoring

- PPPL Director and Deputy Director to strengthen weekly meeting with NCSX management (including ORNL)
 - Status of work performed *vs.* plan
 - Status of outstanding risks
 - Mitigation actions planned, required PPPL and ORNL resources
 - Initiate corrective actions immediately
- A monthly review of the NCSX project will be held by the PPPL Director, Deputy Director and Head of Engineering and Technical Infrastructure, two senior managers from outside the project, including by work package:
 - cost and schedule performance
 - updated ETC
 - variance reports and action plans
 - milestone status
 - update of risk register
- NCSX moved to higher location on PPPL Org Chart to indicate to everyone at the Laboratory increased management attention and resource commitment.



Part of PPPL Org Chart





* ORNL

Improved Reporting

- PPPL Director, Deputy Director and NCSX Project Manager to meet monthly with Princeton University's PPPL Operations Oversight Board to report results of monthly internal review.
- Propose monthly meetings of Princeton Dean for Research, PPPL Director, PPPL Deputy Director and NCSX Project Manager with DOE-SC Associate Director for Fusion Energy Sciences and DOE Director of Office of Project Assessment to report progress, issues, plans.
- Princeton University to sponsor 6-month external reviews of NCSX engineering and project management, in preparation for Lehman Reviews. Reports to Princeton's PPPL Operations Oversight Board.



PPPL can Complete NCSX on the Proposed Cost and Schedule

- PPPL is committed to the success of NCSX.
- NCSX Engineering and Management have been strengthened.
- Much stronger monitoring and reporting processes are being implemented.
- I believe that the cost and schedule estimate is reliable.
 - It is based on much better understanding.
 - It is based on a much improved cost, schedule and contingency estimating process.
 - It will be implemented with much more rigorous project management.

