

PEMP FY16 Report Card Implications for NSTX-U

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U.S. DEPARTMENT OF
ENERGY

Office of
Science



How DOE Labs are Evaluated

Internal - PPPL Staff

- Each year, the Office of Science (SC) conducts an evaluation of the scientific, technological, managerial and operational performance of the contractors who manage and operate its ten national laboratories.
- PEMP = Performance Evaluation and Measurement Plan
- The SC laboratory appraisal process uses a common structure and scoring system across all ten of its Laboratories. Structured around eight Performance Goals, it emphasizes the importance of delivering the science and technology necessary to meet the missions of DOE; of operating the Laboratories in a safe, secure, responsible and cost-effective way; and of recognizing the leadership, stewardship and value-added provided by contractor managing the Laboratory.



DOE Performance Summary

Goal	Grade FY16	Grade FY15
1. Mission Accomplishment	B	B+
2. Scientific Facilities	C	C+
3. Program Management	C+	B+
4. Contractor Leadership & Stewardship	C-	B+
5. Environment, Safety & Health	B+	B
6. Business Systems	B	B+
7. Facilities and Infrastructure	B-	B
8. Security and Emergency Management	A-	B+



Where do we go from here?

- Recognize that FES wants NSTX-U to succeed and be an effective user facility contributing to Fusion Energy Science
- Recurrent theme is the impact of not operating on the US fusion program
 - We are expected to turn this around
- Success in engineering will enable success in research
 - All of us need to support the efforts of the Engineering Department
 - We are all in this together and need to move forward as a team.



Fulfill the Notable Outcomes

- **EXTENT OF CONDITION**

- *FES: Complete an extensive extent-of-condition review of NSTX-U to identify all design, construction, and operational issues. Prepare corrective action plan (CAP) to include cost, schedule, scope, and technical specifications of actions. Complete the CAP review and report to DOE by March 31, 2017.*

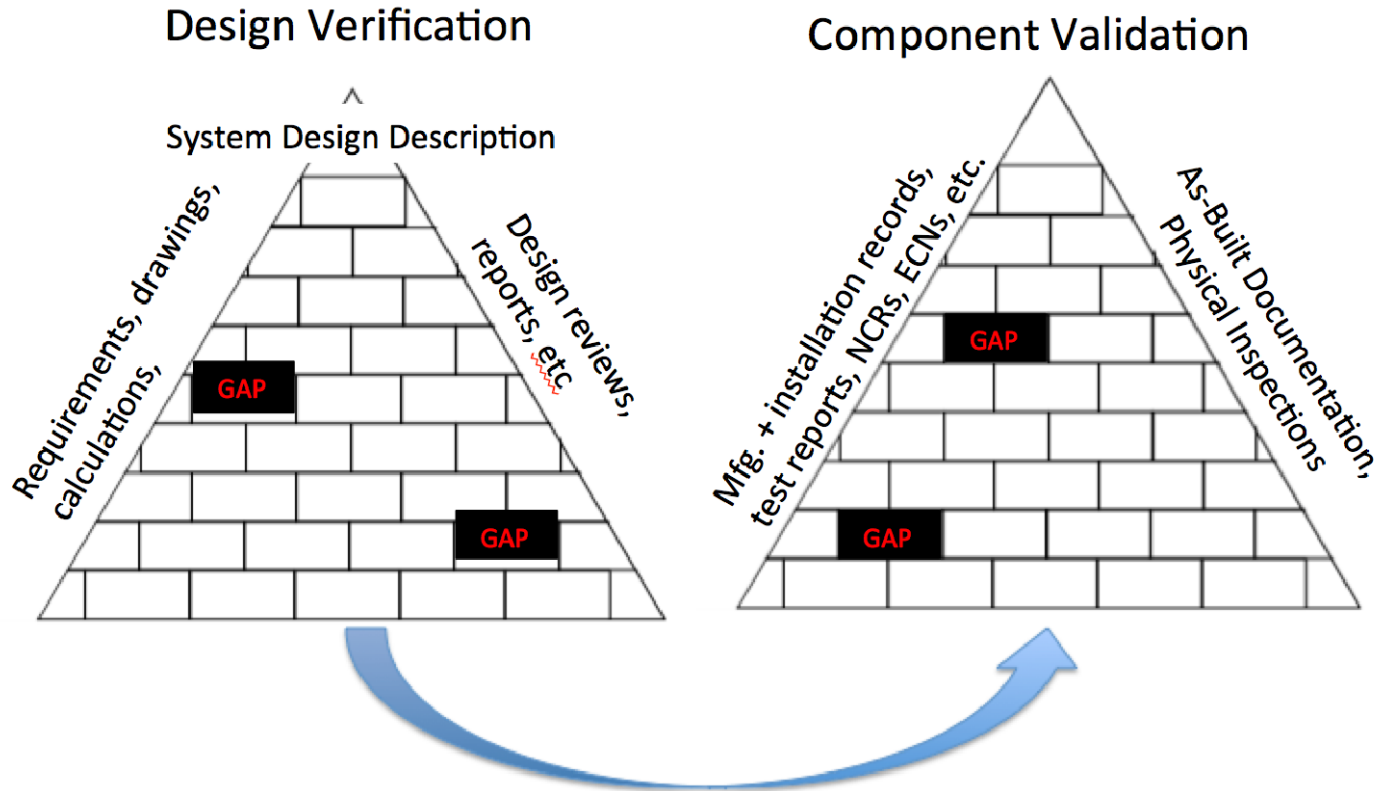
- **EXTENT OF CAUSE**

- *SC/PSO: Conduct a review of policies and procedures for design, construction, installation, commissioning and operations of NSTX-U and other construction activities and projects. Develop corrective actions to ensure the highest quality project management across the lab.*



Design Verification & Validation Review

System Design Description (SDD) is key element



Research Staff will support SDD development

- Some SDDs becoming available now, more in early January

SDD	Responsible Engineer (RE)	Assisting Researcher
Systems Integration / GRD	Charlie Neumeyer	Jon Menard
Vacuum Vessel & Internal Hardware	Marc Sibilia	Ron Bell
Magnets	Steve Raftopoulos	Randy Wilson
Vacuum & Fueling Systems	Bill Blanchard	Devon Battaglia
Cooling systems	Neway Atnafu	Clayton Myers
Power Systems	John Dellas	Dennis Mueller
Heating Systems	Tim Stevenson	NBI: Mario Podesta, RF: Rory Perkins/Joel Hosea
Real Time Control & Protection	Frank Hoffmann	Dan Boyer
Central Instrument & Control	Greg Tchilinguirian	Roger Raman (+ Devon Battaglia)
Diagnostics	Bob Ellis	Brent Stratton + Bob Kaita + Matt Reinke
Bakeout Systems	Joseph Petrella	Matt Reinke
Test Cell	Erik Perry	Randy Wilson
Operations	Al Von Halle	Walter Guttenfelder



Develop Corrective Action Plan Based on the Gaps

	Reuse	Maintain	Rebuild	Test/ Analyze	Redesign
Design Acceptable	Y	Y	Y	Y	N
Fit for Function	Y	Y	N	?	-
Remaining Life	Y	N	-	-	-

- We are being given an opportunity to make the case for fixing NSTX-U.
 - There will be an extensive external review of our corrective action plan.
 - We have to get this right.



Extent of Cause Review (L. Hill)

- Program review is project management-centric but will necessarily extend to supporting policies, programs, procedures and work practices in areas such as engineering design, configuration management, conduct of operations, etc.
- Phase approach adopted to support NSTX-U recovery, restart
 - Phase I: Critical review of NSTX-U issues and identification/implementation of near-term actions to preclude recurrence of equipment deficiencies on time line needed to support NSTX-U recovery schedule
 - Phase II: Balance of program reviews and development of corrective action plan by end of FY17



Being Responsive to DOE

- Clearly, there were expectations by DOE that were not met and that is largely management's responsibility.
- We need to communicate DOE's expectations and this was a step in that direction.
- One of DOE's expectations is in the area of housekeeping.
 - This is an area where we can all contribute.
 - Significant issues in D-site but also in offices and elsewhere.
- Good housekeeping is part of conduct of operations
 - Need to address it



PEMP comments motivate possible FY17 FWP Milestones

- Aim to minimize commissioning time spent correcting error-fields
 - Possible milestone elements: Metrology, physics analysis + simulation, TF / PF alignment requirements, engineering implementation, final metrology + in-vessel B-field measurements (?) → predictions for optimal EFC correction
- Need to access higher plasma current ASAP during commissioning
 - Possible milestone: Perform & improve scenario modelling: Plasma current ramp-up, early H-mode, boundary control / gap evolution, vertical control, global and AE stability. Highly beneficial to NSTX-U, ITER prep
- Detecting any coil faults before they cause major damage is critical
 - Possible facility/operations milestone: Identify, conceptualize pre-shot coil **electrical** fault detection schemes based on magnetics, other/new sensors
- 30 day goal: Draft FY17 FWP milestones responsive to PEMP



Need to maintain scientific productivity during outage

- Analyze and publish your NSTX-U (and NSTX) results
 - Especially from IAEA and APS
 - Don't forget patent clearance, Dataspace, and OSTI PRAM
- Advertise results – seminars, PPPL/DOE highlights
- Follow through on collaborations – be lead author on papers, or at least a co-author, have an impact
 - FFCC discussion / review of DIII-D National Campaign proposals yesterday
 - Proposers will be informed of final outcome
- Aim for a major invited talk – APS nominations in May



Strategic Facility considerations for next 5 year plan

- PEMP noted major short-comings in design review processes – specific example: cooling tubes in ends of CS casing
 - **But**, also noted successful completion of CDR for high-priority Lower Divertor Cryo-pump enhancement
 - “PPPL developed a compelling strategic plan to gradually upgrade NSTX-U to operate with metallic coated walls and a flowing liquid lithium divertor to radically improve plasma confinement”
 - “If the upgraded LTX succeeds, PPPL plans to transition NSTX-U to operate with lithium-coated walls”
- ⇒ Generally supportive of NSTX-U/LTX + EAST PMI vision(s)
- Need to plan and execute this vision methodically, deliberately, safely

Safety – Doing it Right the First Time

- Yes, there will be a great deal of work to do.
- Safety must and will take precedence over schedule pressure.
 - Cannot afford to take shortcuts that endanger anyone.
- In Safety and more generally in everything we do, we are expected to do it right the first time.



Thank you!

- For your hard work and achievements
- We have a lot to do – let's get it done together
- Have a great, relaxing, and safe holiday!

