

Supported by

NSTX TF Update / Plans



WNSTX

NSTX Team Meeting

NSTX Team Meeting Agenda

Time: 10:00 ~ 11:30, August 17, 2011 Place: MBG Auditorium, PPPL

- NSTX TF Update (30 minutes)
- NSTX Project / Program Items (60 minutes)



TF Bundle Dissection Performed

- TF bundle short involving TF # 13, 14 and 30 was measured to be ~ 2 feet from the bottom, eliminating a quick repair possibility.
- Replacement conductors available if the bundle rebuilding is needed.
- **TF** bundle dissection performed on August 11 12, 2011.
- Significant localized arc damage involving TF # 13, 14 and 30 copper conductors, water cooling tubes, and insulation found confirming the initial assessment.







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Inner TF Bundle Electrical Test Indicates a Short at ~ 2 Feet From the Bottom





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TF Bundle Dissection Performed on August 11-12, 2011





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TF Bundle Dissection II





TF Bundle Dissection III



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TF Bundle Dissection IV





TF Bundle Dissection V



TF Bundle Dissection VI





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TF Bundle Dissection VII



TF Bundle Dissection VIII



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#1 priority is to find the cause of the fault

- Dissection of the TF bundle together with analyses providing valuable information
 - It appears that the fault primarily involved the cooling tubes in TF # 14 and TF #30.
 - The overall bundle appears to be in a good condition outside of the arced region. No obvious sign of defects nor deterioration.
 - Stress analyses of the bundle are performed in parallel
- An external team of experts are being invited to advise on the TF fault and the TF Upgrade Design once sufficient information is gathered.
 - The review to take place after the Labor Day.
 - The experts are being contacted.
 - Relevant information will be sent prior to the meeting.
 - Assure that the upgraded TF design reflecting what we leaned.

Upgraded TF Have Much Improved Design

Present TF bundle (Diameter is ~ ½ of the Upgrade TF)



Upgraded TF bundle



- Complicated two layer design
- Complicated cooling water path
- 3/16" refrigeration cooling tube
- B-stage insulation

- Identical simple conductors
- Simple straight cooling water path
- 3/8" K-type straight copper tube
- More robust VPI insulation

We Are Considering Two Possible Plans

 Plan A: Rebuild the coil and run for ~ six months then go into the Upgrade Outage

Pros: Obtains additional pre-upgrade data.

Cons:

- Cost is increase (rebuilding new TF bundle and increase in upgrade cost due to the schedule delay)
- Delays the upgrade by ~ 10 months from the base plan.
- Results in significantly less run weeks compared to the base plan.
- The Upgrade Project may have to be re-baselined.
- Plan B: Go immediately into the upgrade outage Pros:
 - Accelerate the upgrade by $\sim 6 9$ months from the base plan.
 - The upgrade cost is reduced compared to the base plan.
 - Results in comparable longer term run week to the base plan.

Cons: Not able to obtain additional pre-upgrade data.

The TF Repair Will Not Be Quick Likely To Require ~ 10-11 Months



Comparison of Plan A & B Assuming the same budget assumptions

	FY2011	FY201	2 FY	2013	FY2014	FY2015
BASE	C)PS	Outage (30 mos.)			OPS
Α		TF Rebuild	OPS	0	utage (30 r	nos.)
В		Outage (30 mos.)				OPS

	Pre-U Op	Post-U Op	Total Op
BASE	8 months	12 months	20 months
Α	7 months	2 months	9 months
В	0	19 months	19 months

Plan B appears to be a longer term win but with a shorter term pain

The NSTX Upgrade Project Requires ~ 30 Months of Test Cell Access



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If we choose Plan B, we still have a lot to do during the down time

