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Update on PFC-PMI Work Group

for the Fusion Nuclear Science Pathways Assessment

---------- co-chairs ----------

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- ***Organization of PFC-PMI Working Group***
- ***Gaithersburg Meeting, June 12-13, 2011***
- ***FNSPA Report***

Visuals by Richard Nygren, presentation by George Tynan based on material and discussion from many contributors to FNSPA

PFC-PMI Subtasks

PFC Configuration

Whyte, Chan, Peng, Stambaugh, Nielsen, *Majeski*

Issues related understanding of power exhaust from plasma, power sharing between the divertor and first wall, the potential and risks of configurations such as the super-X divertor, reactor-relevant hot wall operation, potential for liquid surface PFCs

Evolution of PFC Materials

Tynan, Kurtz, *Doerner, Allain, Rognlien*

This includes modifications of materials from ion and neutron damage as well as the effects of operating temperature and our capability to develop predictive models.

Engineering Trade-offs for PFCs

Nygren, Tillack, Morley, Meier, Wirth, Merrill

Thermal performance and high heat flux testing, design integration.

[Trade-offs approach differed from other subtasks.]

Sandia National Laboratories

Comments on Process

FNSPA: FNSF options, design studies, R&D needed, near term emphasis (roll forward) but relevance for DEMO (roll back)

- Laudable goal, charter from Ed Synakowski in November, concern about product (RD tasks, level, decision points)
- Face-to-face meetings by Core Group and some Task Groups; PFC-PMI Task used phone conferences and e-mails
- Continuing frustration with lack of definition of scope, slow rollout of process, due primarily to poorly defined scope
- PFC-PMI progress slowed in spring due to obligations for other work by leaders
- PFC-PMI identified some high level issues early in the process

Overarching Issues [Decision Pts]

1. **Disruptions – go/no-go for tokamaks**
2. **Materials evolution; solid walls OK?**
3. **Demountable coils OK?; big implications for PFC build, edges/mismatches, etc.**
4. **Operating temperatures; can we accept lower temperature to ease requirements.**

FNSPA Core Team Meeting in June

News Flash: **FNSPA will be handed over to FESAC**

- Legal issue about who can advise FES, e.g., FESAC. FES staff can no longer be involved, except Al Opdenacker who is POC.

Process

- Groups instructed to finish reports – distribution of input internally vetted by groups and contributors set for end July (now end of August).
- Concern over default on implicit promise of "new initiative" and RFP.
- Some form of vetting had always been planned; now FESAC is agent.
- Continued frustration over form of report.

Subsequent Events

FESAC did receive charges; #3 of 3 is for the FNSPA.

Groups are preparing report information.

Status of PFC-PMI Working Groups

PFC Configuration

Draft of section input put out for comment by group with some feedback. Draft of stand-alone R&D section in progress.

In conference call, we discussed the internal "vetting" process and decided that this would likely not be adequately finished and simply to note where more attention would be needed.

Evolution of PFC Materials

Draft of section input put out for comment by group with some feedback.

Engineering Trade-offs for PFCs

Some feedback on early rough draft; still needs work; writing in progress. Draft of stand-alone R&D section in progress.

Introduction is needed to explain flow of chapter on PFC-PMI and links to other sections, e.g., physics, materials and power extraction.