

# Engineering Plans and Requirements

W. Reiersen

NCSX Project Meeting

November 13, 2000

# Top Level Engineering Plan Is in Place

---

- Originally documented in [10/25 memo](#)
- Increased emphasis on engineering content at PVR
  - Plausible design, defensible cost and schedule estimates expected
- **De facto selection of modular coils already made**
  - Tight physics resources for PVR prep primary motivation
  - Technical risk moved to engineering
  - 12/1 deadline given for coming up with saddle coil design with acceptable performance
- The site issue (C-site v. D-site) was given higher priority due to PPPL strategic importance, D&D scope overlap, and cost implications
- **Needs to be coordinated with physics plan**

# Progress in development of the modular option is steady (but slow)

---

- Modular coils modified for tangential NBI
- TF and PF coils added
- Structural concept evolving
- Helical trim coils shown to work
  - Implementation underway
  - Other options still TBD
- **No basis for recommending size change in near future (next 1-2 months)**

# Saddle option effort for downselection trimmed back

---

- Engineering working toward **12/1 deadline**
- Single pass strategy
  - Assume thin, toroidally continuous SS shell
  - Conform winding surface to z07 plasma
    - Mistake? z07 was robustly stable but had poorer QA than li383
  - Reduce error with closer winding surface, more coils
  - Little opportunity for coil optimization by 12/1
- Coil group pursuing saddles on longer timeframe

# Defining Requirements is Critical for a Successful PVR

---

- Physics has to...
  - Define requirements in timely manner
  - Defend requirements at PVR
- Engineering has to develop a plausible design that fully satisfies all requirements
- Top level requirements are currently documented in the [Requirements Table](#)
- Requirements are translated into engineering language in the [Technical Data Sheets](#)

# Critical Requirements Are Still Undefined

---

- Reference scenario
  - No reference equilibria for S1, S2, and S3 for the 1017 modular coil design
- Flexibility
  - No top level requirements defined
  - No corresponding equilibria for 1017
- Trim coils
  - Requirements evolving in tandem with concept development

# Summary

---

- We have a plan (but it still needs to be coordinated with physics' plan)
- Work on saddles will stop come 12/1 (barring unforeseen success before then)
- **Need equilibria** for reference scenario and flexibility to support development of 1017 modular coil design
- Need to incorporate trim coils that work and fit machine configuration
- **Engineering web is operational and should be used to get current requirements and technical data**