Status report on plan to develop a "buildable" coil set for engineering design and analysis

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The plan

- A plan to develop a "buildable" coil set for engineering design and analysis was developed upon recognition that we had no solution that fully satisfied both engineering and physics long after the target completion date

- The plan follows Neilson's guidance to get a "buildable" coil set defined by October 31 for basis of engineering design and analysis (and mfg studies!) even if it does not fully satisfy physics requirements
  - *We are on track for completion by October 31 (3 days away)*

- Use the next 3 months to further develop a coil set that does fully satisfy BOTH physics and engineering
  - *Work plans for this activity (at least for engineering participation) need to be developed, nothing on the books yet*

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Plan for developing a "buildable" design
October 26 status (1)

1. Define a winding surface that is [1] a smooth approximation to Strickler's optimized surface [2] has adequate stand-off from the VV and [3] has a smooth offset surface where the integral shell will be located

    – *Tom Brown developed a winding surface, Art Brooks fit the surface with Fourier harmonics, passed to Dennis Strickler*

    – *Subsequent study of this surface revealed difficulty in purely offsetting the surface to where the integral shell would be located*

    – *ORNL (Cole) is working to define an integral shell that is close to a pure offset to resolve this problem [October 31]*

2. Re-optimize the modular coils on this fixed winding surface with CoilOpt

    – *Dennis Strickler developed a coil set on the fixed winding surface (1018a2), passed to David Williamson*

    – *Long-Poe Ku re-optimized coil currents and assessed physics properties, concluding that "MHD stable states may be found, but the QA can not be recovered" as expected*

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Plan for developing a "buildable" design
October 26 status (2)

3. Manually adjust the winding path on the winding surface to satisfy "buildability" requirements (coil-to-coil separation, minimum radius of curvature)
   - *David Williamson currently making manual adjustments to 1018a2 coil set to satisfy "buildability" requirements [October 31]*
   - *WE PLAN TO USE THIS COIL SET AS THE BASIS FOR ENGINEERING DESIGN AND ANALYSIS and MFG STUDIES FOR THE CDR*

4. Generate coils currents for S1, S2, and S3 using modified 1018a2 coil set
   - *Long-Poe Ku should receive modified 1018a2 coils from Williamson on or about October 31 for current re-optimization. Optimized coil currents are due by mid-November for S1, S2, and S3 states.*

5. Continue search for a coil set that fully satisfies BOTH physics and engineering criteria
   - *Primary hopes are merged optimizer and CoilOpt using a spline representation [February 15]*

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