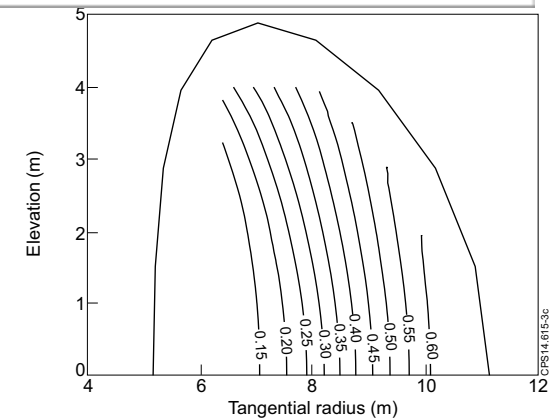
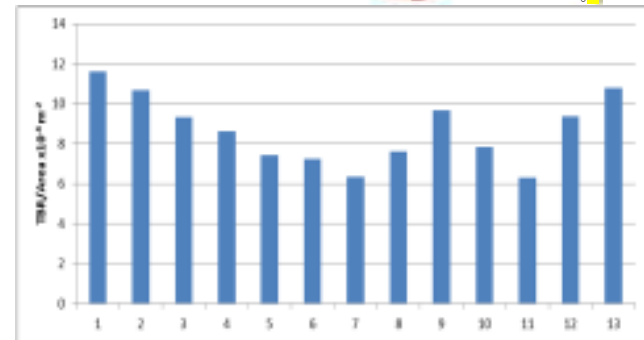
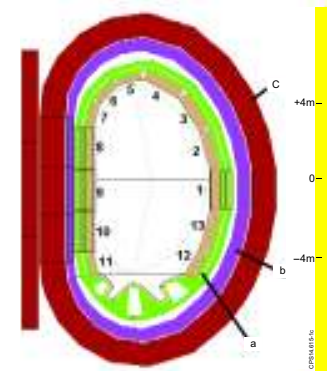


FIP P/7-5 Impact on Tritium Breeding Ratio of Neutral Beam Port Location in DEMO (I Jenkins)

- Essential to obtain Tritium Breeding Ratio (TBR) >1.05 for self-sufficiency in tritium
- MCNP model of toroidally continuous HCPB blanket shows difference in TBR/area for blanket modules
- Placing 4 NB beamlines at mid-plane reduces TBR in this model from 1.12 to 1.08 – other ports would be required for diagnostics etc. reducing TBR still further
- Neutral Beam Current Drive analysis on possible DEMO steady state plasma scenarios shows feasibility of injecting at $\pm 4\text{m}$ relative to plasma mid-plane with ports in modules with lower TBR/area
- NB port at position Module 3 would reduce TBR to 1.09, at position module 12, TBR = 1.10
- If on-axis NBCD required, beamlines entering through ports above/below mid-plane would need to be inclined – difficult but may have to be considered as impact on TBR of integrating other necessary ports is considered.



Contours of NBCD efficiency, γ for a 1MeV beam into DEMO SS flat density scenario