Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Stellarator Pilot Plants with Simplified Coils M.C. ZARNSTORFF, G.H. NEILSON, T. BROWN, D. GATES, PPPL — Stellarators have a significant advantage as a pilot plant since they do not need current drive, reducing recirculating power, reducing required technology development, and easing tritium breeding. In addition, stellarators have soft performance limits without disruptions, and thus do not require nearby conducting walls, thick plasma-facing armor, active plasma stability control, or current profile control. A stellarator pilot plant design based on a quasi-axisymmetric (QA) configuration with aspect ratio 4.5, major radius 4.75 m, and magnetic field on axis of 5.6 T is projected to have a Qeng greater than 2.7 and a peak neutron wall load higher than $2MW/m^2$. The pilot plant projects to net electricity production with 100-200 MW of fusion power produced. The QA design can build on the tokamak understanding and data base, since it is predicted to share many confinement and stability characteristics with tokamaks. Strategies for simplified coils and sector-based maintenance using magnetic materials for field shaping will be discussed.

M.C. Zarnstorff
PPPL

Date submitted: 23 Jul 2012 Electronic form version 1.4