Abstract Submitted
for the DPP06 Meeting of
The American Physical Society

Role of Advanced-Fuel and Innovative-Concept Fusion in the Nuclear Renaissance[1] JOHN F. SANTARIUS, Univ. of Wisconsin — Developing attractive fusion power requires overcoming physics, engineering, economic, and environmental obstacles. From a purely physics perspective, D-T fuel in combination with the tokamak seems most attractive. However, low-neutron advanced fuels, especially D-^{3}He, in combination with innovative confinement concepts appear very attractive from an engineering, safety, environmental, and licensing perspective. The crucial question is how advanced-fuel physics development compares to the engineering difficulties D-T fusion faces, such as tritium-breeding blanket design, neutron damage to materials, and frequent maintenance in a highly radioactive environment. With respect to physics issues, burning advanced fuels requires continued plasma physics progress and development of a suitable high-β innovative concept. This talk will summarize the key issues—including plasma power density, surface heat flux, materials damage, activation, nuclear proliferation, and ^{3}He fuel supply. Some potentially suitable innovative confinement concepts will also be described.

[1]Research supported by the Univ. of Wisconsin

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Date submitted: 21 Jul 2006 Electronic form version 1.4