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Alternative Zirconium Diffusion Barrier Application Methods

C. A. Gunzel

National Security Directorate

Pacific Northwest National Laboratory, 902 Battelle Boulevard, Richland, WA 99352 – USA

ABSTRACT

The purpose of this presentation is to describe a variety of alternative zirconium diffusion barrier application methods, discuss process development goals, and then provide a status update of the 3 specific methods of applying a Zr diffusion barrier to the fuel meat (foils) being developed by the Fuel Fabrication Capability Pillar within the Material Management and Minimization (M3) Convert Program. In 2012 a program decision was made to explore possible methods to apply a zirconium diffusion barrier between the UMo foils and the aluminum cladding. The methods selected for development and demonstration are the optimization of the baseline process known as “co-rolling”, and the development of two alternative processes; “plasma spraying” and “electro-plating”. This discussion will explain each of these processes, present current process demonstration results, and articulate further development activities planned to achieve full-scale production capabilities. Particular emphasis will be placed on technical merit, reproducibility, scaling, throughput, scrap stewardship, quality, economics, schedule, and risk.