PBMR Fuel

Presentation to the US DOE
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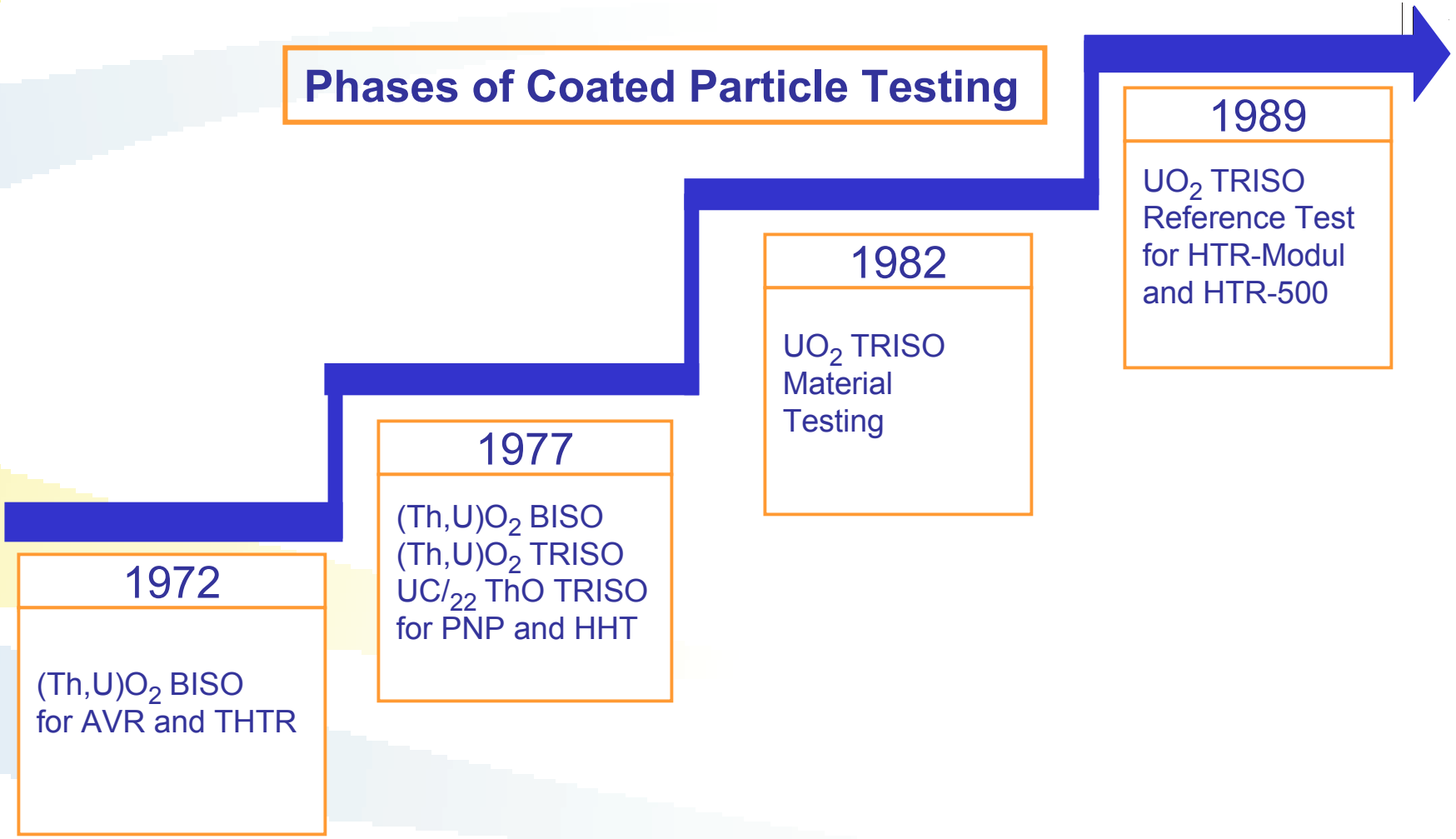
Introduction

- Origin and history of PBMR fuel design
- Operational envelope for PBMR fuel relative to German testing
- PBMR fuel development process
- Fuel specification
- Fuel performance
- Fuel irradiation qualification schedule

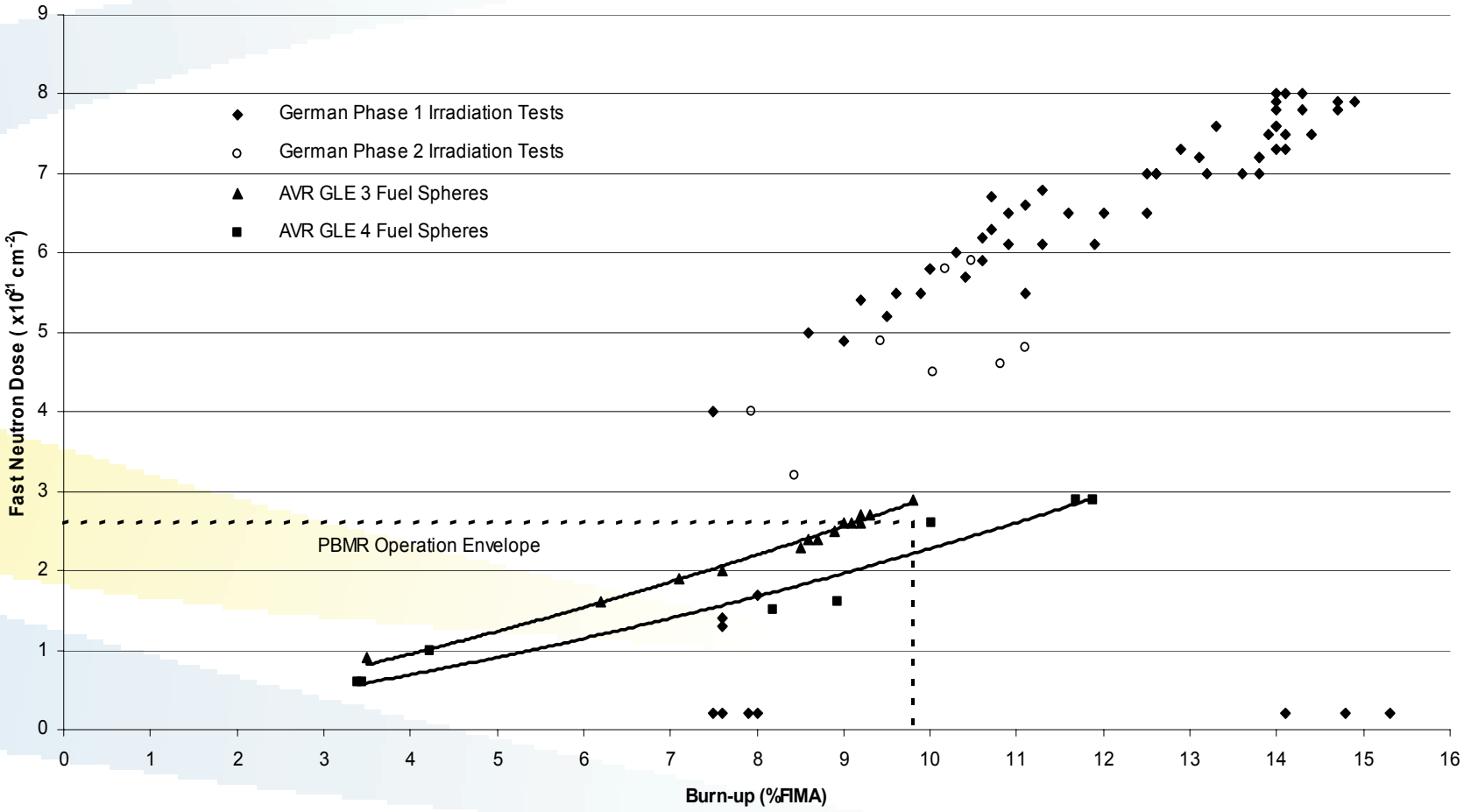
HTR Fuel Sphere Development in Germany



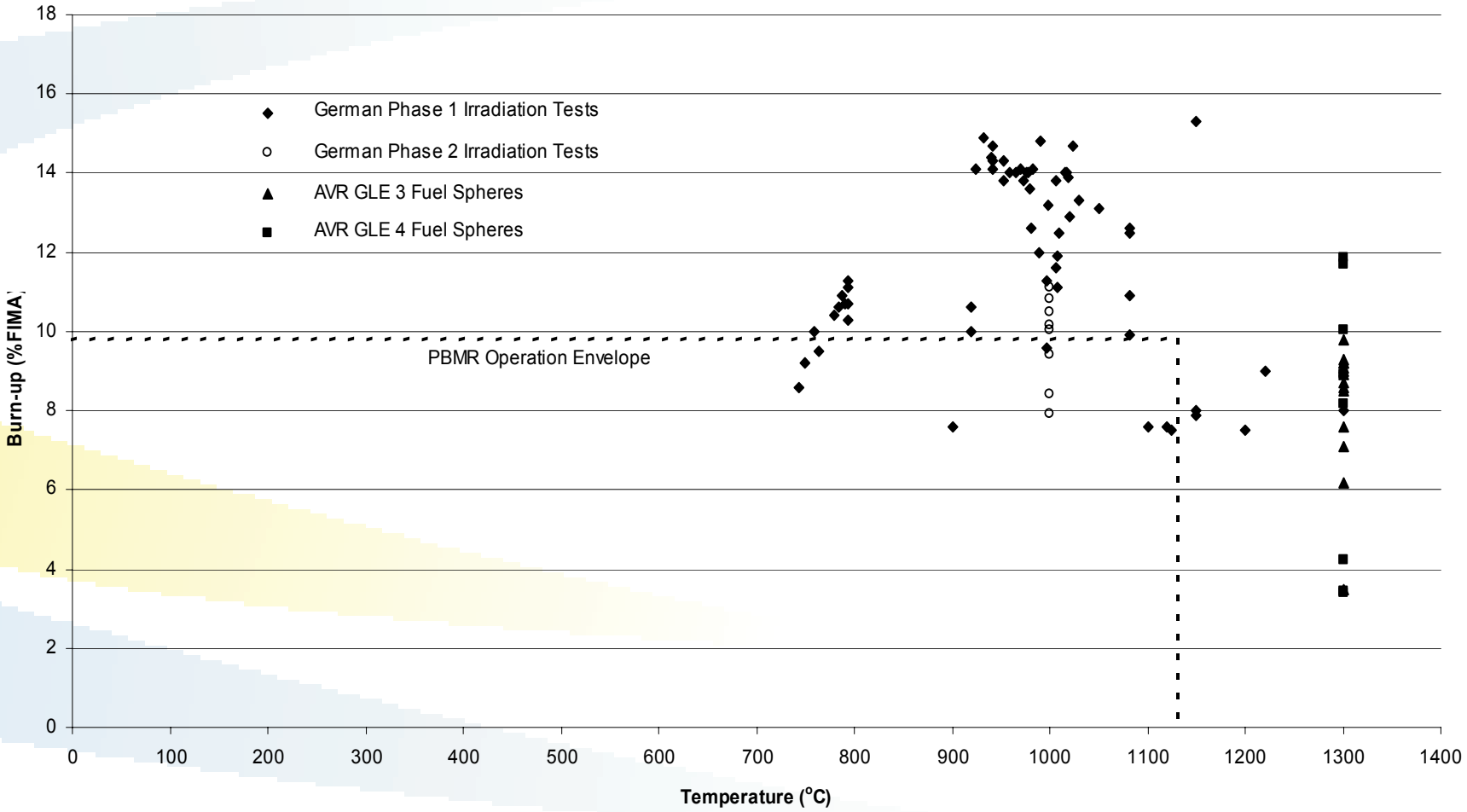
German Philosophy

- Develop a stable process that produces a product of consistent quality
- Produce a product under strict quality control
- Irradiate the product and measure its fission product retention capability
- Include the process in the specification

PBMR Operational Envelope in Relation to German Testing Domain



PBMR Operational Envelope in Relation to German Testing Domain



PBMR Fuel Development Process

- Decision to use LEU-TRISO fuel design developed in Germany for PBMR fuel
- NUKEM data base for manufacture of German state of the art (1988) fuel spheres

PBMR Philosophy

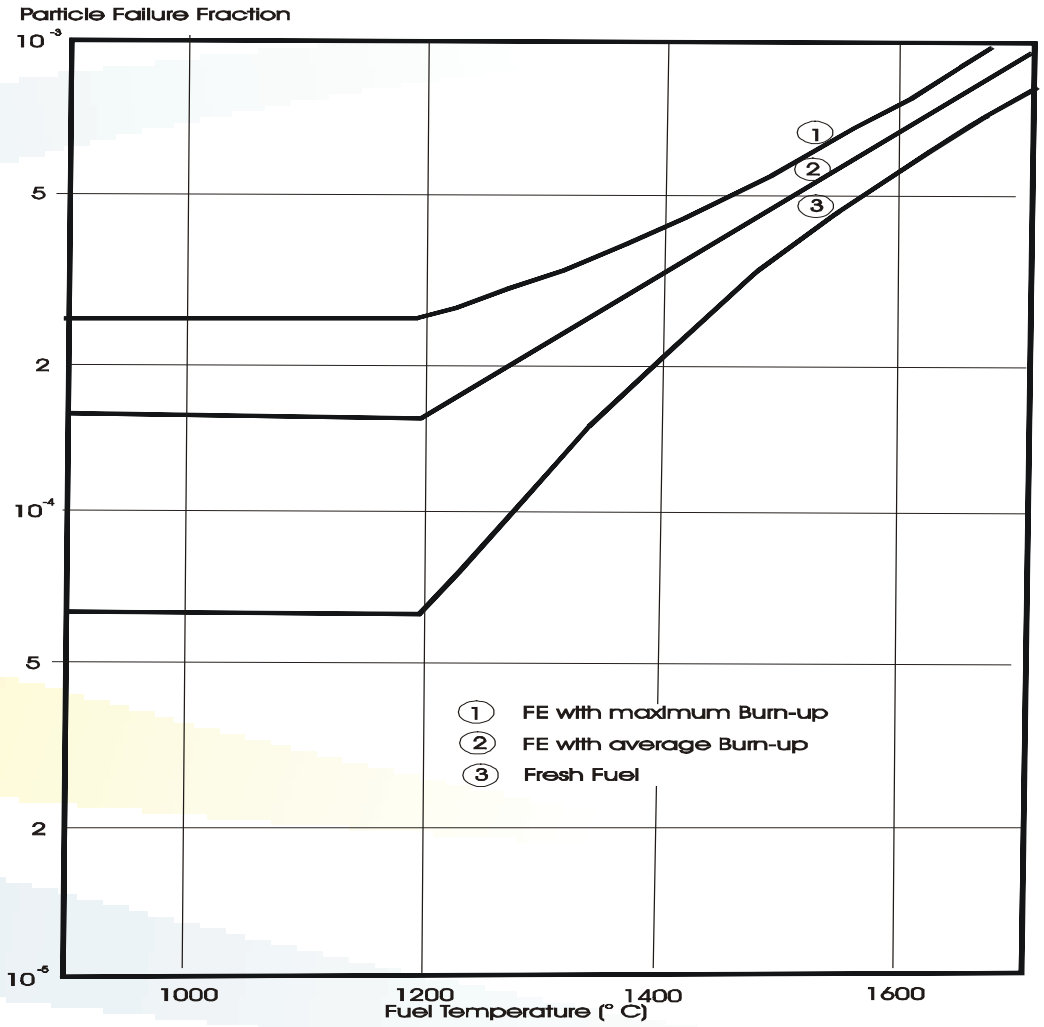
- Use German final fuel sphere specifications (1988 AVR 21-2 & Proof Test)
- Produce a product equivalent to the German product
- PBMR operational envelope within that established by German irradiation tests
- Perform only PBMR reactor specific irradiation tests

Equivalence

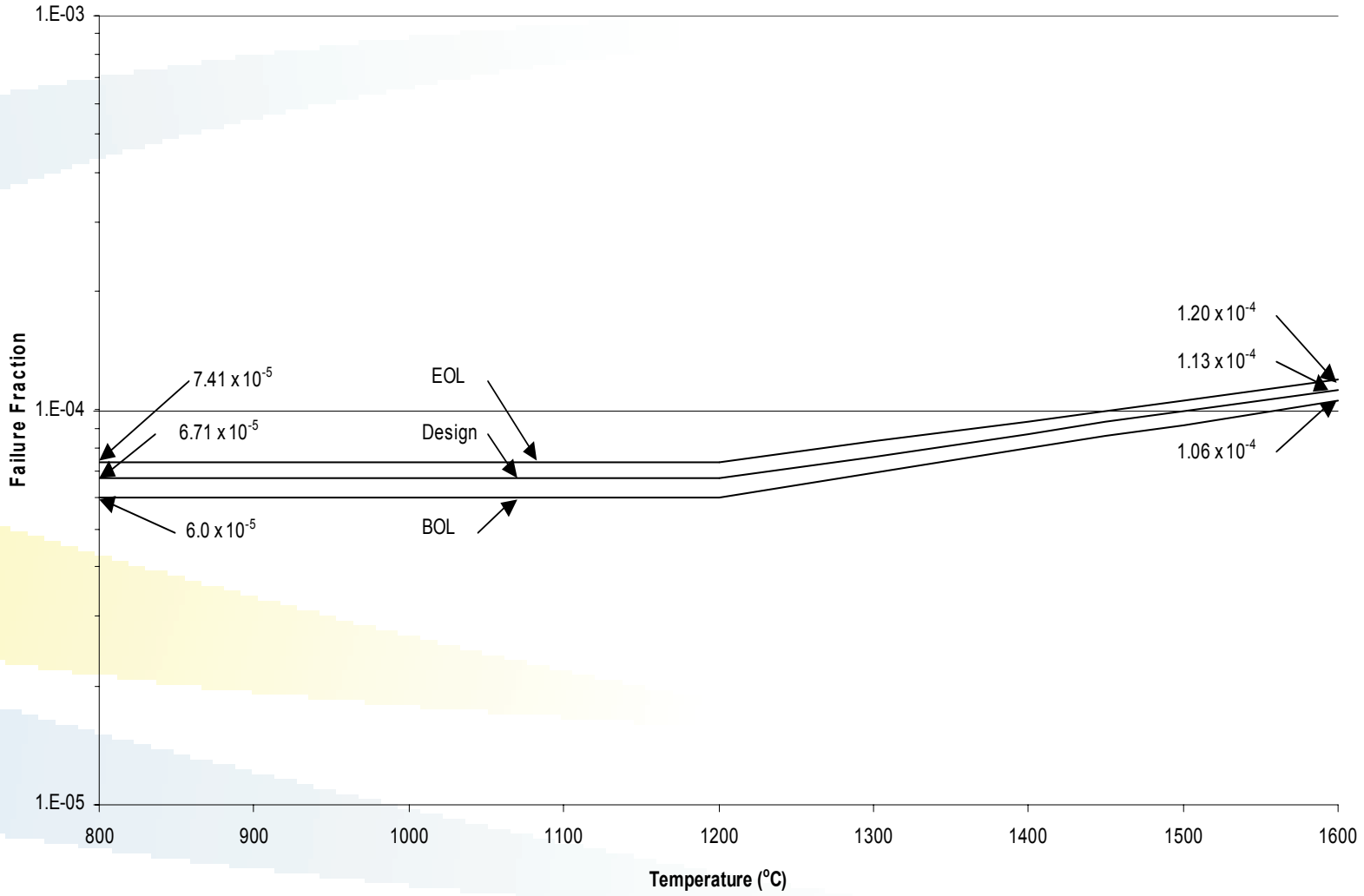
Equivalence of manufacture is defined as:

- Using the German 1988 specification – which includes the specification of the coating process
- Using ‘similar’ direct materials
- Using the same manufacturing process and identical equipment for critical processes
- Using the same QC process

Nominal Fuel Performance Used in HTR Modul Licensing Case



Fuel Performance Predicted for PBMR Fuel



Irradiation Test Programme

	Advance Production Fuel	Production Fuel		
	Allow Fuel Loading Demonstrate SAFARI. Proof Test Fuel	Allow Burn-up to 4% FIMA	Allow Burn-up to 8% FIMA	Full Proof Test to 10%
SAFARI	4 Spheres (Test Demo) PIE + Heating	4 x FE PIE + Heating	4 x FE PIE + Heating	
IVV-2M	4 x FE to target burn-up (10%) PIE + Heating			12 x FE , PIE +Heating