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KEY ACTION : NUCLEAR FISSION

HTR-N

High-Temperature Reactor Physics and Fuel Cycle Studies

CONTRACT N°
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Work Package 3
Task 1

Specification of HTR-MEDUL Core for different fuel cycles

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Table I: Main Data of the MEDUL-HTR for Pu-burning

Geometry and material zones see **Fig. 1!**

Core height	9.43 m
Core diameter	3.0 m
Number of fuel elements/ m ³	5394
Helium temperature	
Core inlet	250 °C
Core outlet	700 °C
Helium pressure, Core inlet	60 bar

Table II: Nuclide Densities in reactor zones (Fig. 1)

cm⁻¹ barn⁻¹

(Boron is added to graphite in order to simulate impurities)

Zone Nr.			
1	Reflector	N _C = 7.72 E-02	N _B = 1.31 E-
08			
2	Void		
3	Void + graphite	N _C = 2.00 E-03	N _B = 3.40 E-
10			
4	Reflector	N _C = 9.03 E-02	N _B = 1.54 E-
08			
5	Carbon	N _C = 8.53 E-02	N _B = 4.98 E-03
6	Reflector + coolant channels	N _C = 7.02 E-02	N _B = 1.19 E-
08			
7	Reflector + control rods	N _C = 3.51 E-02	N _B = 7.27 E-
06			
8	Reflector	N _C = 3.51 E-02	N _B = 5.96 E-
09			

Table III: Fuel Element Specifications

Diameter of pebbles	6 cm
Diameter of fuel zone	5 cm
Density of graphite	1.75 g/cm ³

Possible variants of the coated particles:

Coating layers	C / C / SiC / C
Density	1.05/1.90/3.18/1.90 g cm ⁻³

Fuel	Diameter of Cernel	Maximum burnup allowed
UO ₂	0.50 mm	800 MWd/kg
PuO ₂	0.24 mm	800 MWd/kg
ThO ₂	0.50 mm	120 MWd/kg
(U-Th)O ₂	0.50 mm	120 MWD/kg
(Pu-Th)O ₂	0.50 mm	120 MWD/kg

Isotopic composition of typical “1. Generation”- LWR-Pu:

Pu-38/ Pu-39/ Pu-40/ Pu-41/ Pu-42 = 1/ 62/ 24 /8/5 %

T i t e l:

A u t o r:

E r s t e l l D a t u m :

ATTENTION: Post-script File