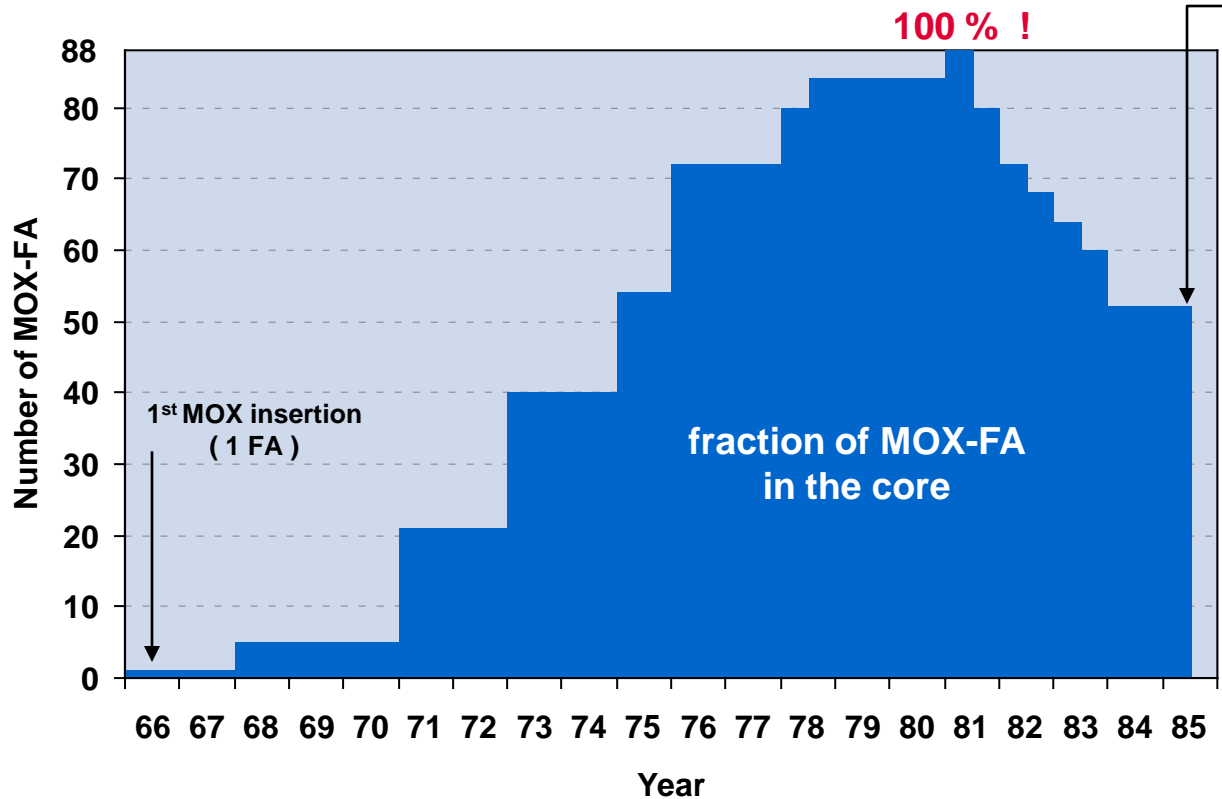


RWE Started with MOX-Recycling in BWR in the Year 1966 (1st worldwide)



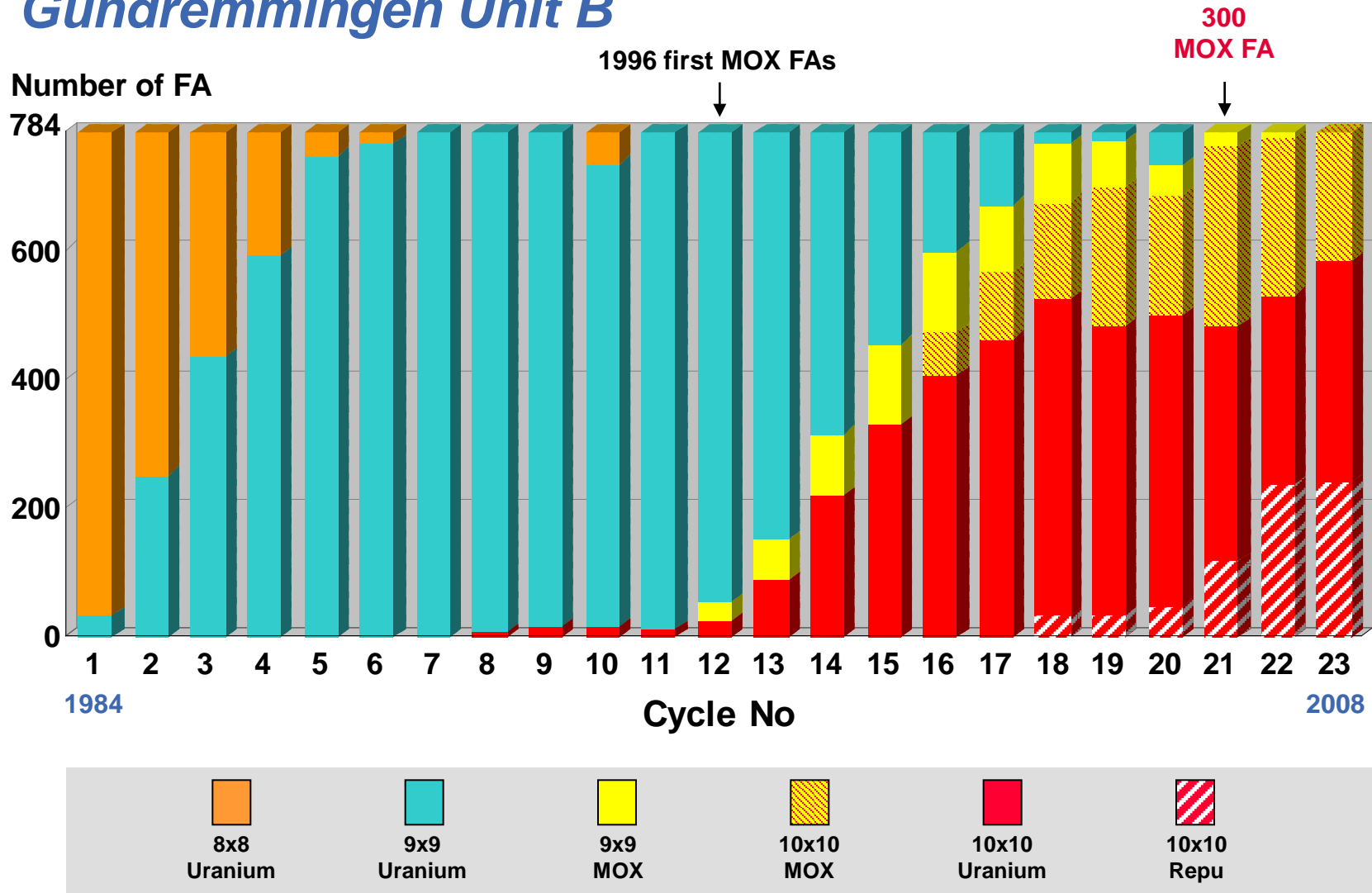
decommissioning
of the plant started 1985



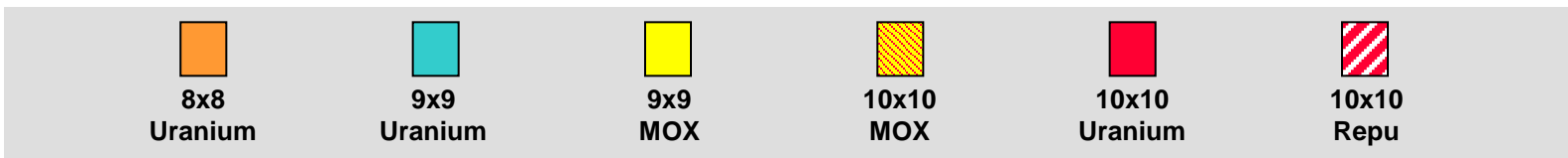
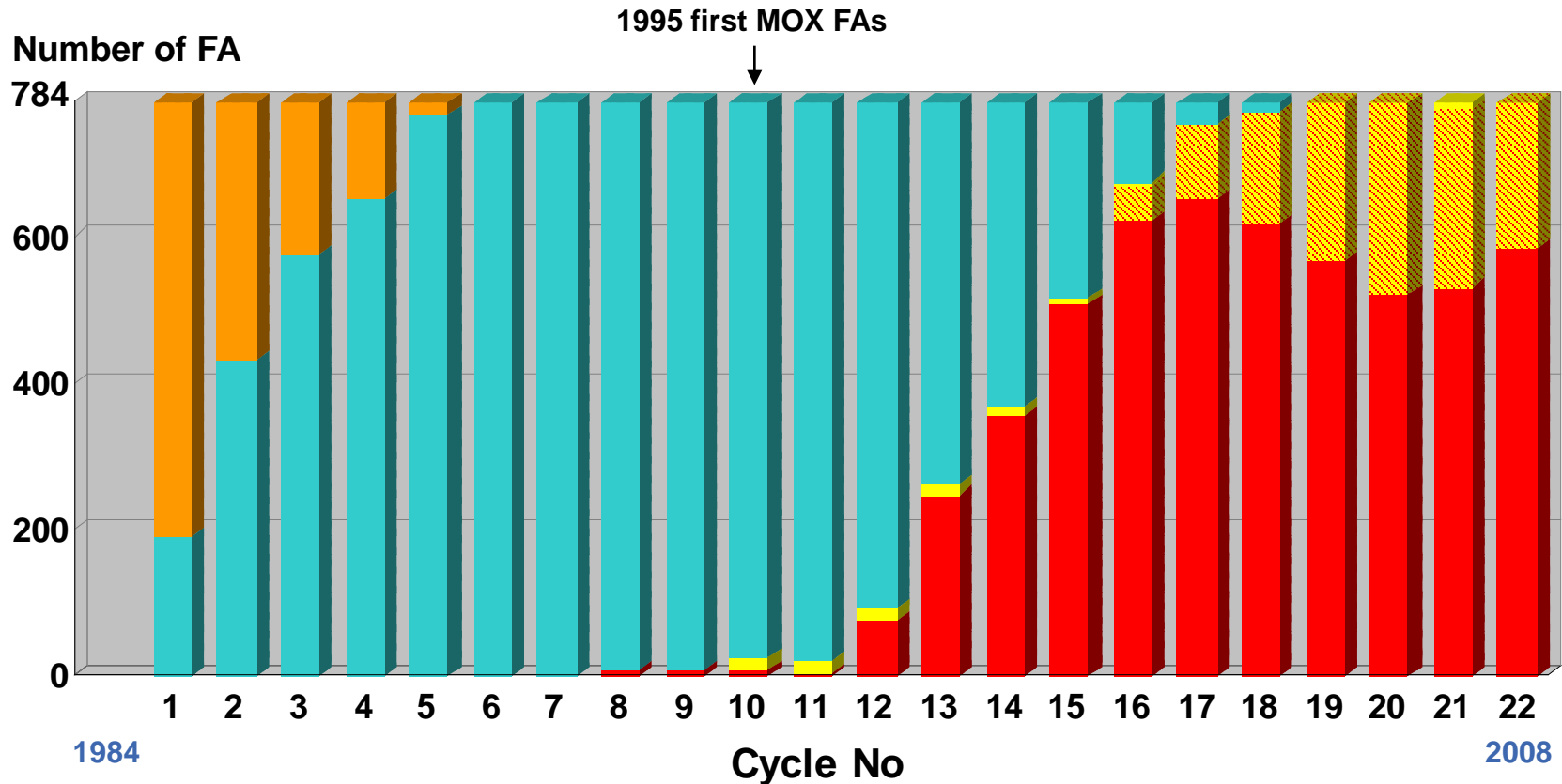
Insertion of „MOX-(island)-FA“ in the first german BWR „Kahl“ (VAK)

VAK : 88 FA, 16 MW_{el}

Development of Core Composition Gundremmingen Unit B



Development of Core Composition Gundremmingen Unit C



MOX Gundremmingen Licensing Activities

- 01 / 1989** Application for license (9x9 MOX, equivalent to 3.14 w/o U235 9x9 FAs)
- 03 / 1991** 40 000 objectors against MOX in Gundremmingen
- 06 / 1991** Planned public hearing in Gundremmingen (shifted to indefinite future)
- 01 / 1993** Public hearing at the Augsburg fairground finally
- 01 / 1994** 9x9 MOX-License
- 03 / 1994** Claims against license
- 03 / 1995** Court procedure (3 days, refusal of claims)
- 06 / 1995** First MOX insertion (unit C, 16 9x9 MOX FAs)

- 07 / 1996** Application for license (10x10 MOX, equivalent to 3.75 w/o U235 10x10 FAs)
- 01 / 1998** 10x10 MOX-License (02/98 claim against license, 03/98 withdrawal of claim)
- 06 / 2000** First 10x10 MOX insertion (unit B, 68 10x10 MOX Fas)

- 10 / 2005** Application for license (10x10 MOX, equivalent to 4.60 w/o U235 10x10 FAs)
- 02 / 2006** Extended 10x10 MOX-License
- 07 / 2008** Planned MOX insertion with $Pu_{fiss} \approx 4,5$ w/o

Today's MOX-License (Licence from February 2006)

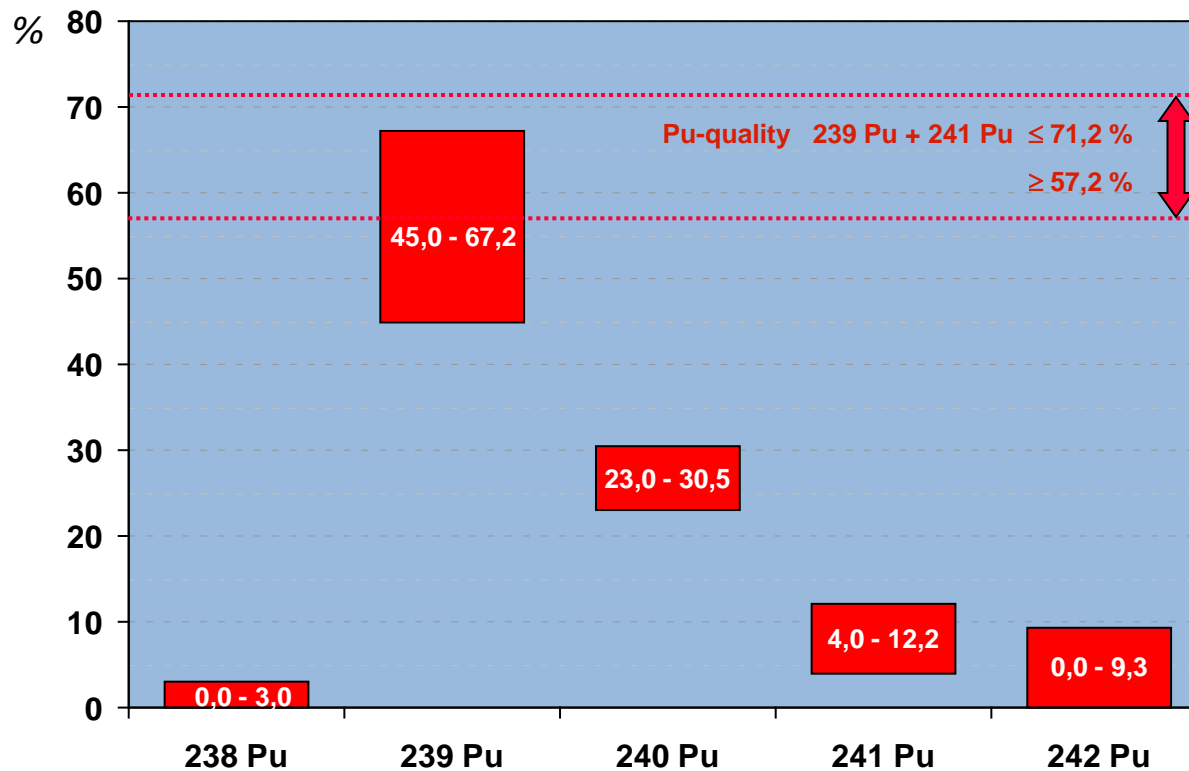
10x10 MOX-FA Boundary Conditions

Gundremmingen Units B and C

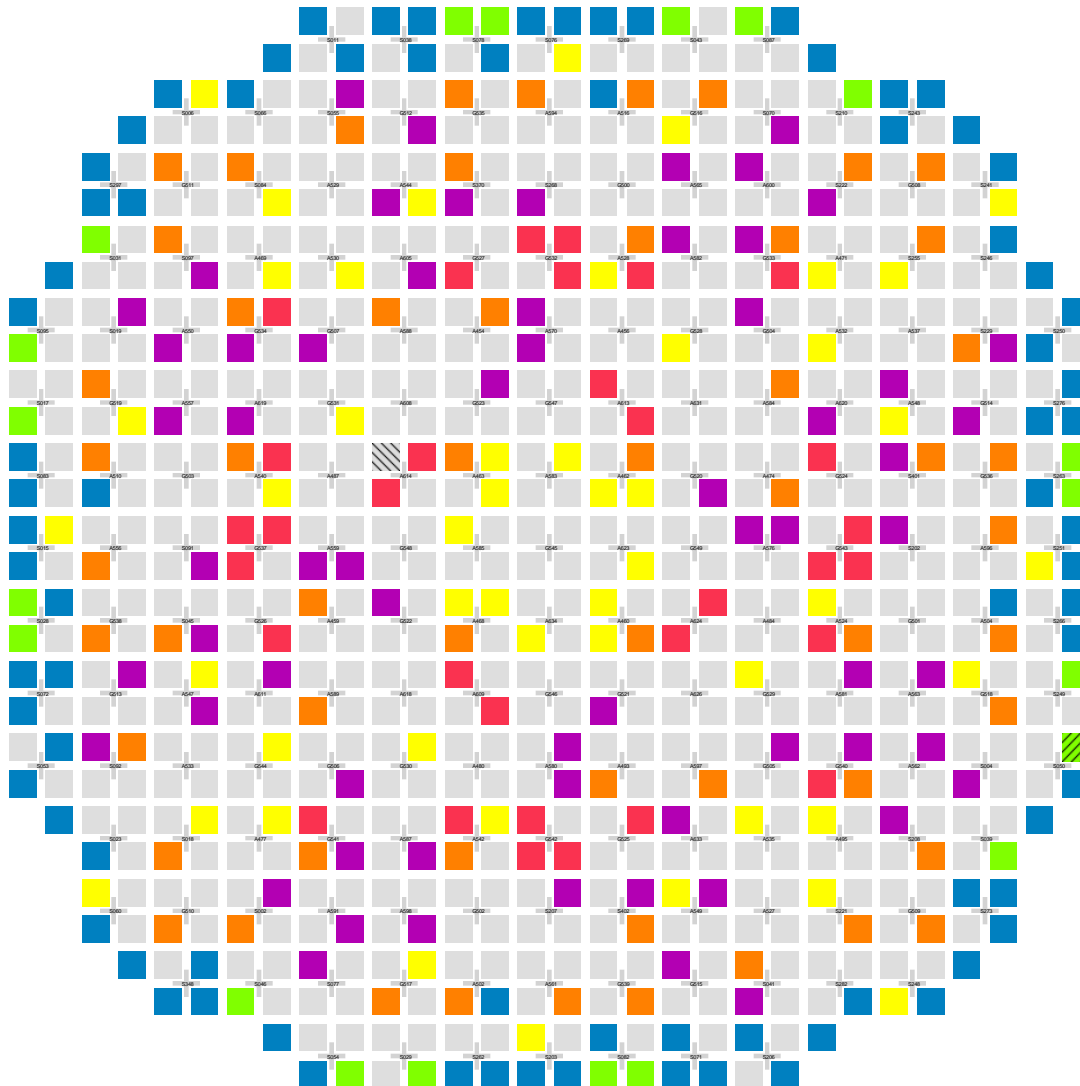
number of fresh MOX- FA per reload	≤ 68
number of MOX- FA in core	≤ 300 (38.3 %)
Pu_{fiss} content	corresponding to burnup-equivalence with 4,60 w/o U-235 10x10 U-FA
but :	
average FA Pu_{fiss} content	≤ 5.49 w/o
rod Pu_{fiss} content	≤ 8.00 w/o
and some restrictions in the Pu-isotopic composition	

Range of „Pu-Vectors“ Included in Today's MOX-License

The proofs in the licensing reports cover every theoretically thinkable Pu-composition within the ranges given in the figure below !



MOX-Core-Management at licensing-limit Gundremmingen, Unit B



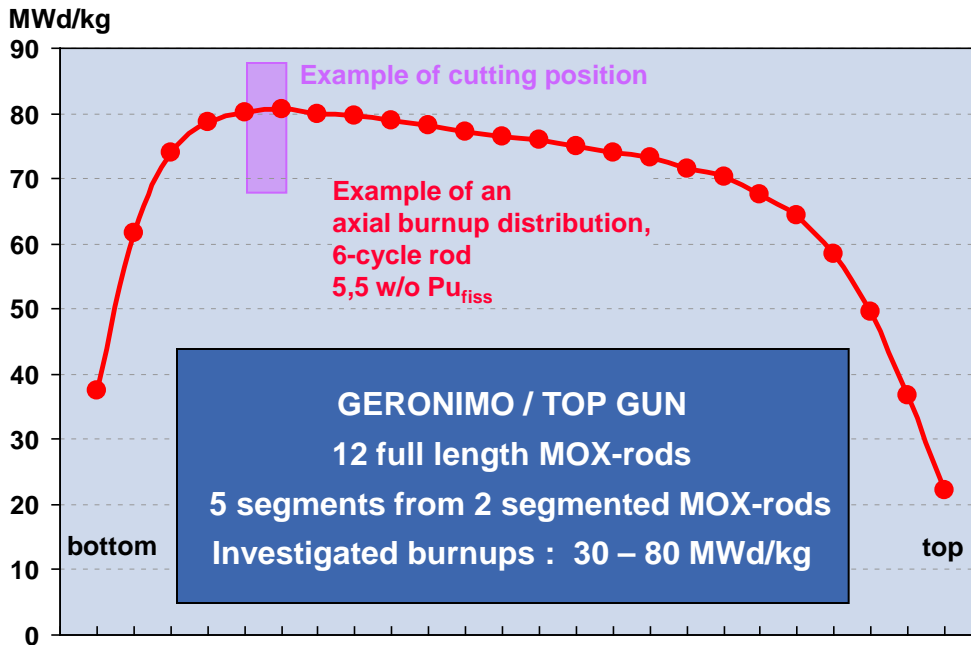
21. Cycle
2005

300 MOX-FA
in core

GERONIMO / TOP GUN Ended in 2006

BELGIUM	BELGONUCLEAIRE SCK · CEN
FRANCE	AREVA NC
GERMANY	RWE Power / E.ON AREVA NP
JAPAN	NFI GNF-J Japanese Utilities TEPCO TOHOKU CHUBU HOKURIKU CHUGOKU JAPC EPDC

Non destructive tests
Rod by rod FA γ -scanning Visual inspections Eddy current tests Oxide thickness Rod diameter & length Axial gross γ -scanning Axial γ -spectrometry X-radiography
Destructive tests
Puncture tests Ceramo-metallography + α auto-radiography EPMA / SEM Density Radiochemical burnup + special isotopes Thermal diffusivity
Ramp tests
Peak power up to 465 W/cm Fission gas release during ramps



Fabrication of Gundremmingen MOX-FA

(BWR specialities compared to PWR)

More Pu_{fiss} „enrichments“



*Spare rods after change of FA-type
(i.e. 9x9 → 10x10)*

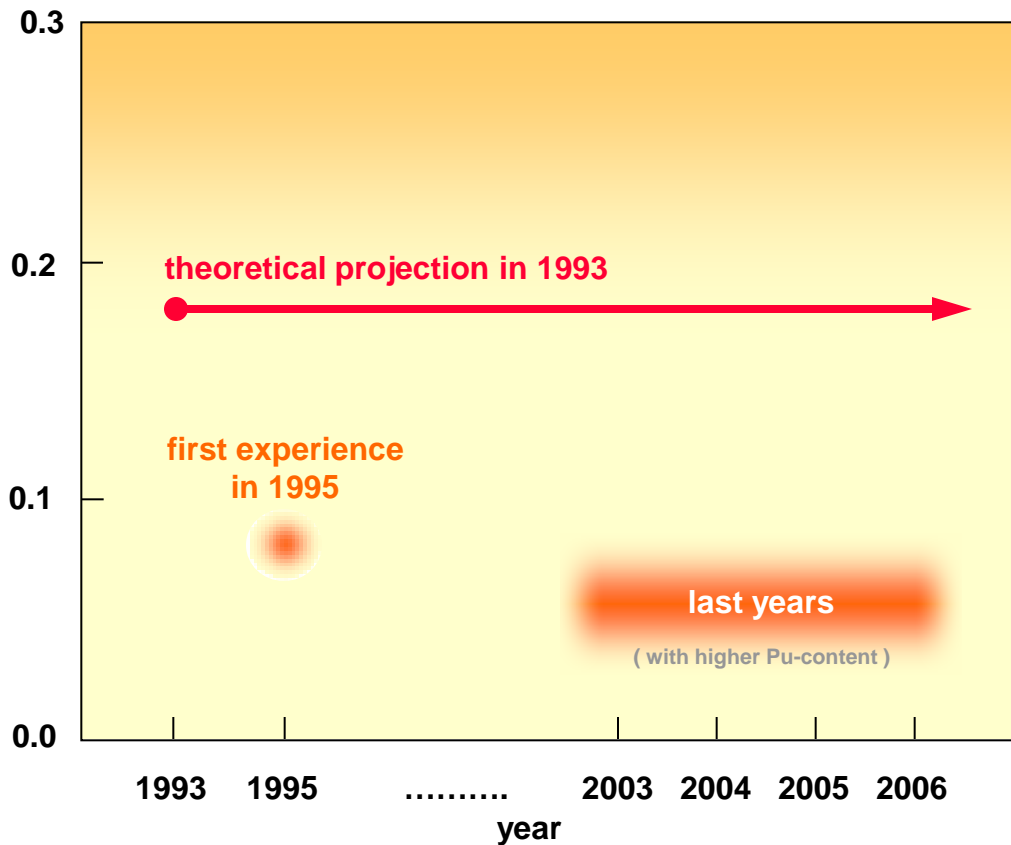


*Higher demands upon pellet quality
(PCI-risk)*



Dose During Handling of Fresh MOX FAs in Gundremmingen

mSievert / MOX-FA



How much Pu_{fiss} did we recycle in GUN ?

