

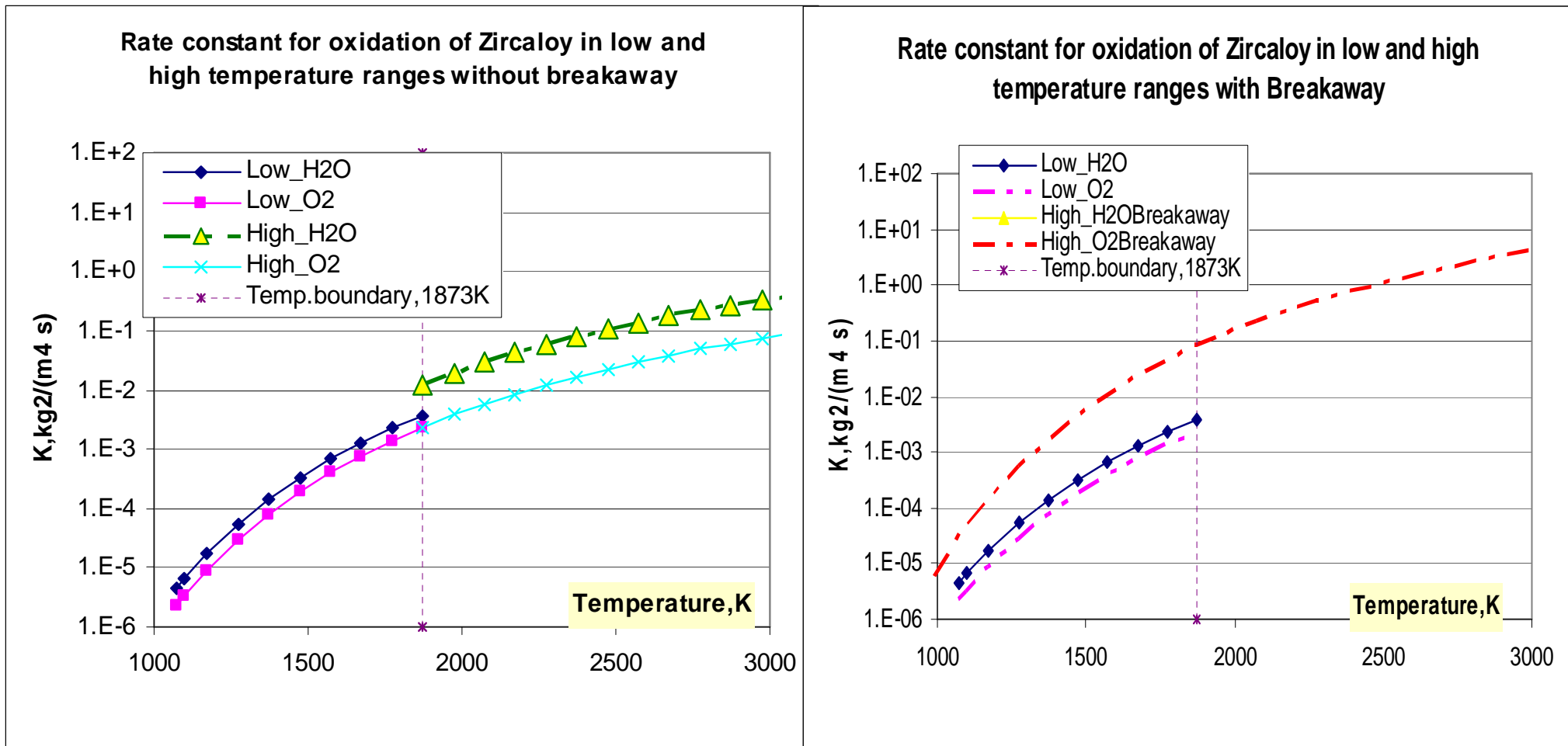
Estimate of Reflood Times and Flow-Rates for Spent Fuel Pool to Avoid Breakaway Oxidation of Cladding based on MELCOR Data

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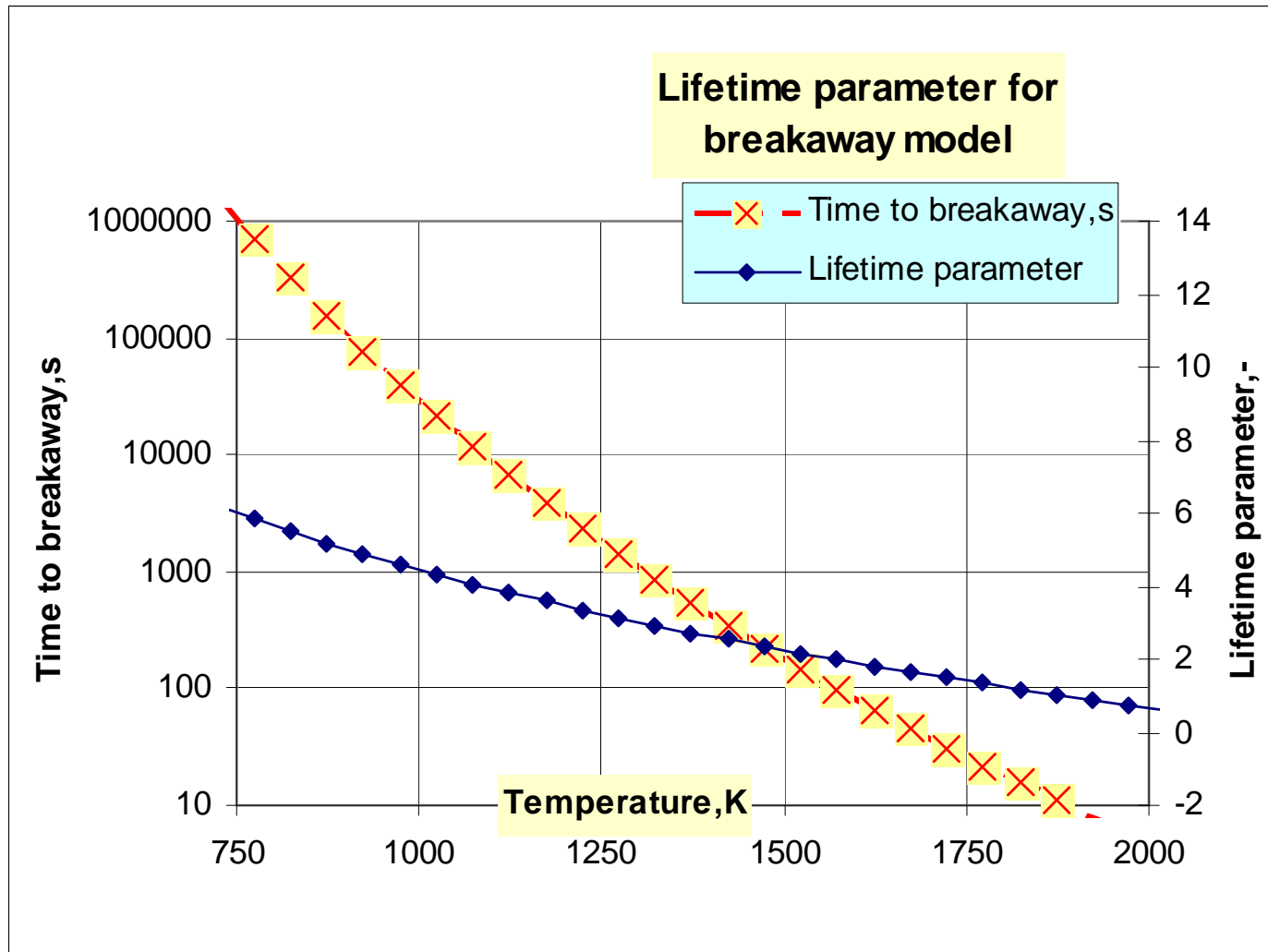
Contents

- Oxidation kinetics of the cladding without and with breakaway phenomenon
- Application to SFP of a VVER-440
- With 1 layer of assemblies
- With 2 layers of assemblies

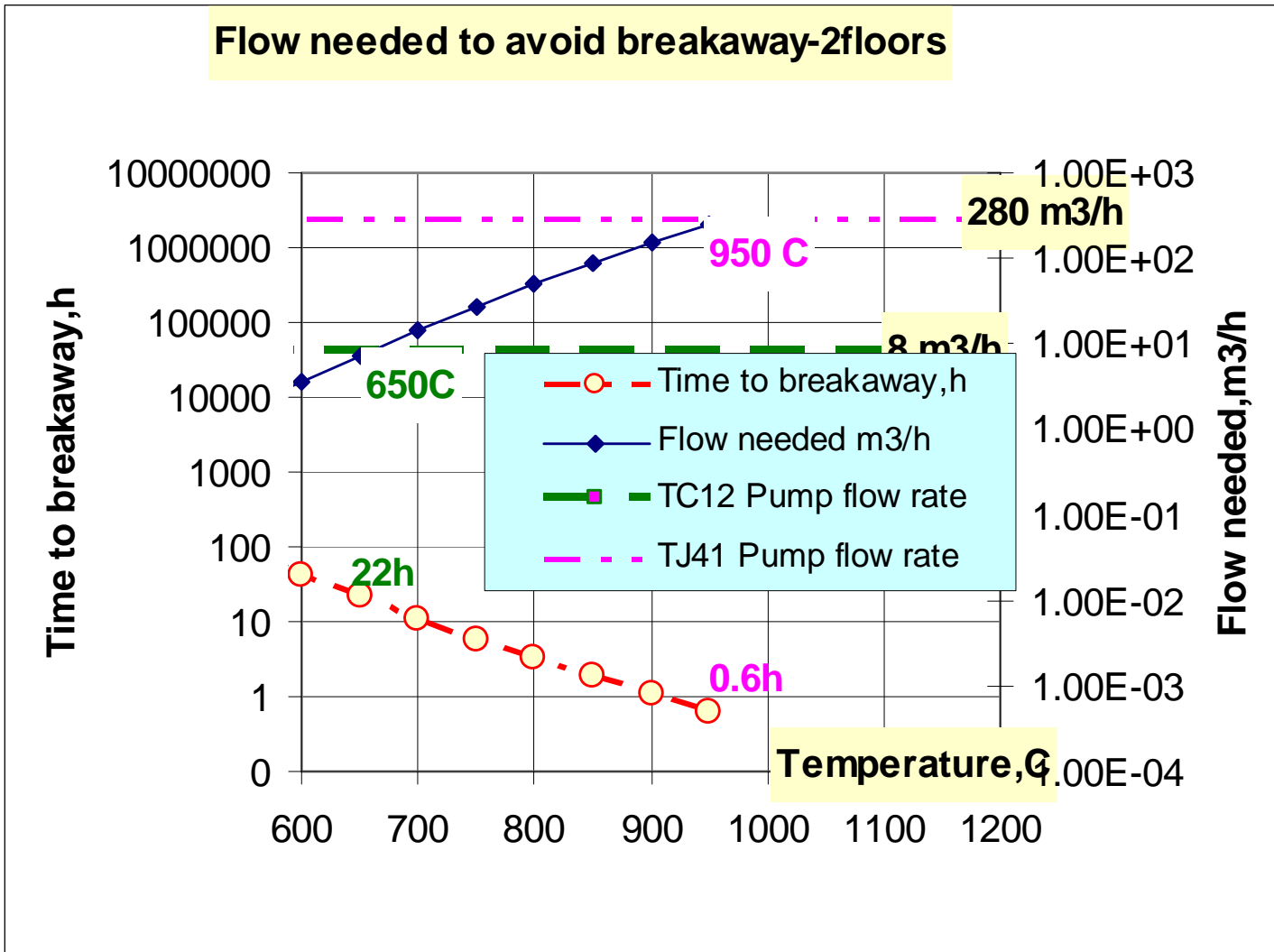
Cladding oxidation kinetics with and without breakaway



Lifetime parameter: to predict transition to Breakaway



Flow-rate needed to refill the SFP to avoid BREAKAWAY in a VVER-440 with 2 layers of fuel in the SFP

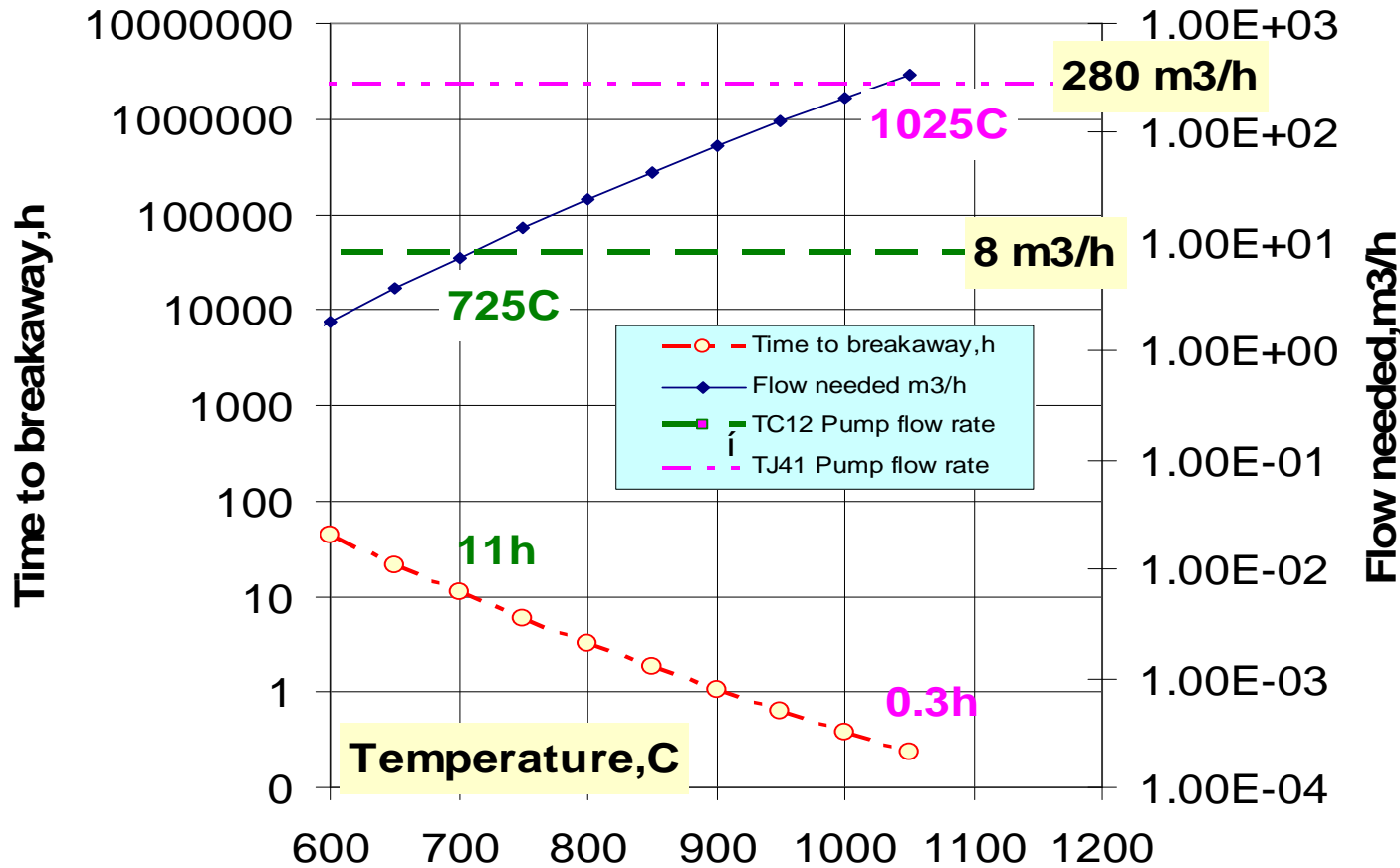


At 650C time to breakaway is 22h:
Flow-rate needed=8m3/h

At 950C time to breakaway is 0.6h:
flow-rate needed=280m3/h

Flow-rate needed to refill the SFP to avoid BREAKAWAY in a VVER-440 with 1 layer of fuel in the SFP

Flow needed to avoid breakaway-1floor



At 725C time to breakaway is 11h:
Flow-rate needed=8m3/h

At 1025C time to breakaway is 0.3h:
flow-rate needed=280m3/h

Conclusions

*Time available to
breakaway strongly
depends on temperature*

*Cladding failure and Fission
Product release may happen
before the **BREAKAWAY**
oxidation of the cladding*