



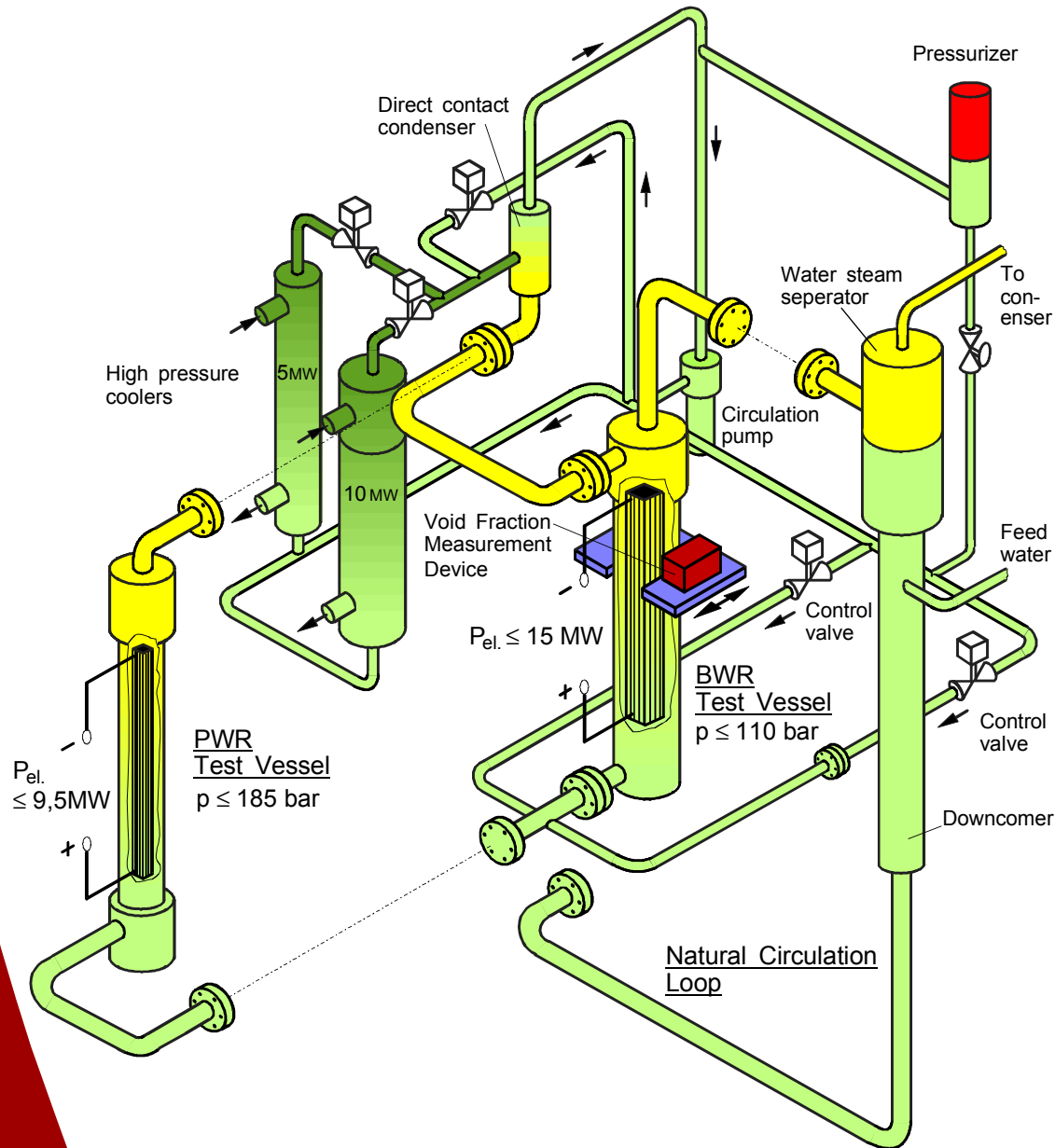
FRAMATOME ANP

KATHY General Description : NRC-Visit

Critical Heat Flux Tests at the Multifunction Thermal Hydraulic Test Loop KATHY

A. Beisiegel, TGT3

Critical Heat Flux Tests at the Multifunction Thermal Hydraulic Test Loop KATHY



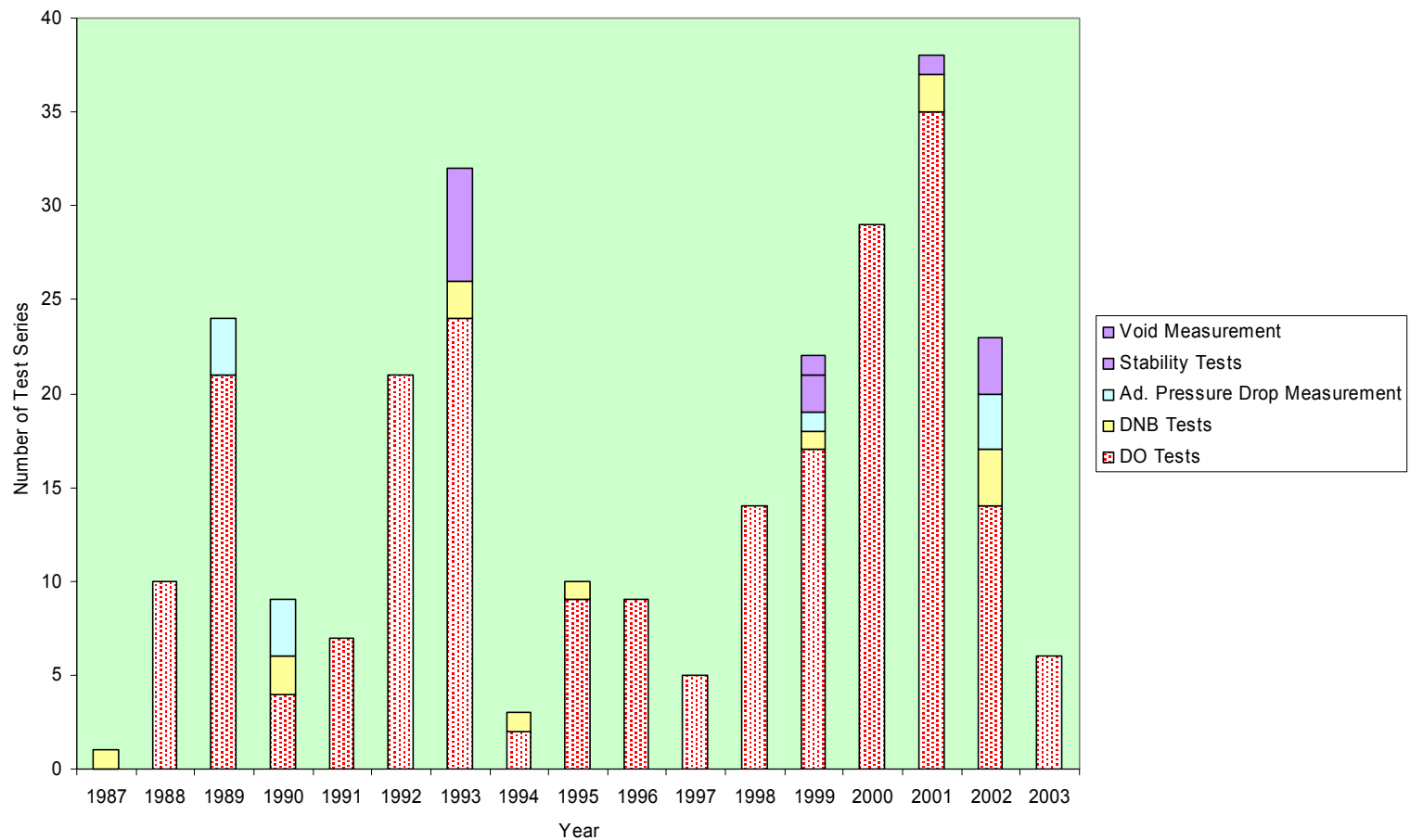
General Test Loop Data

- **Maximum electric output** 15 MW
- **Maximum pressure** 165 bar PWR
110 bar BWR
- **Possible bundle arrays** 5 x 5 PWR
9 x 9 BWR
10 x 10 BWR
12 x 12 BWR
- **Mass flow** 1.5 – 20 kg/s

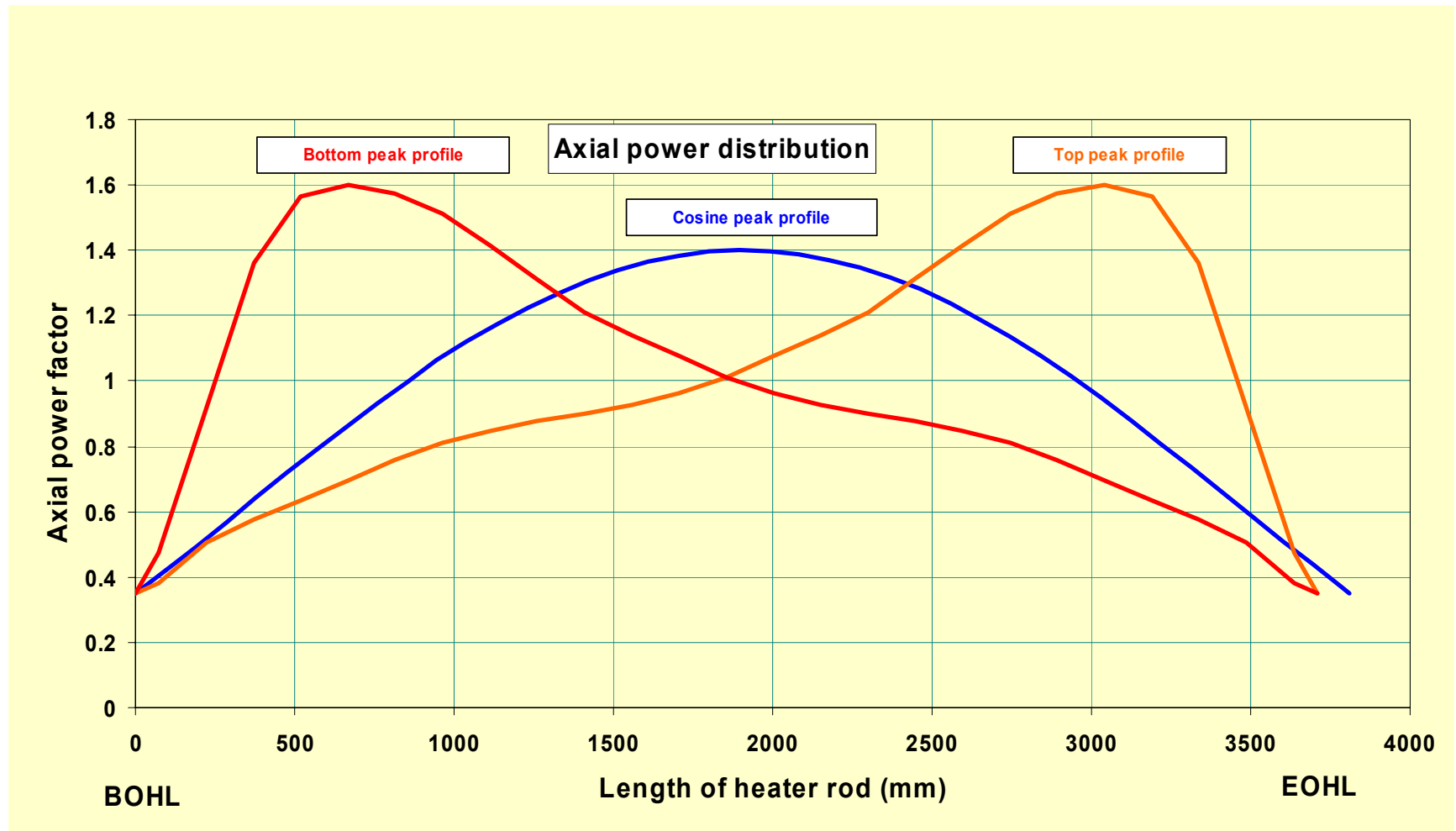
Technical Center - TGT3 Components Qualification Karlstein

Critical Heat Flux Tests at the Multifunction Thermal Hydraulic Test Loop KATHY

Test series carried out on the KATHY Loop since 1987

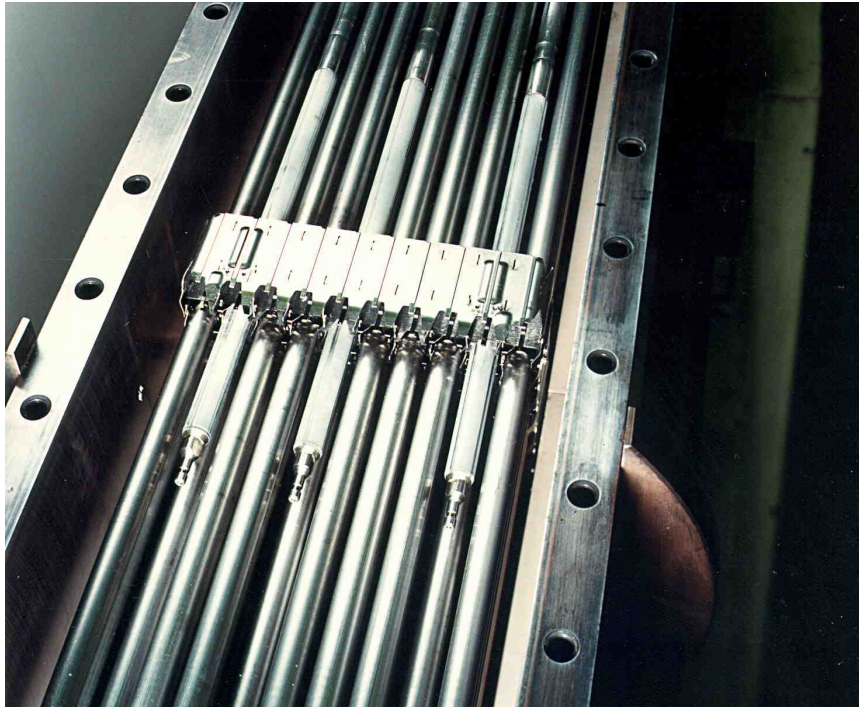


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Available heater rod profiles: bottom, cosine, top

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Part-length heater rods with cosine top or bottom peak axial power profile require extremely-high precision manufacturing.

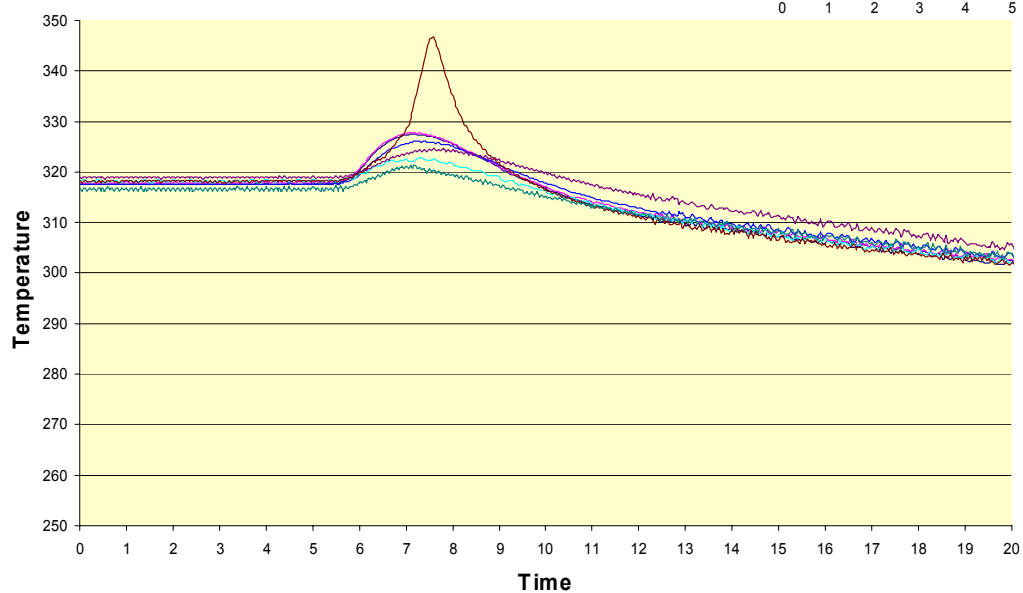
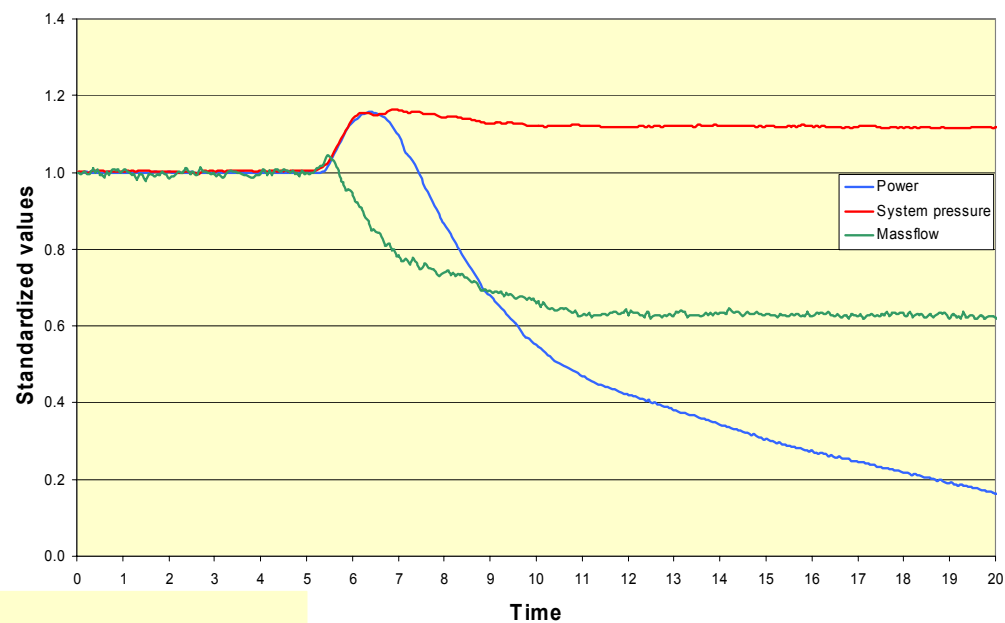
Operating the 15 MW Dryout / DNB Test Loop from the control panel.

Part-length heater rods of a BWR test bundle and control panel



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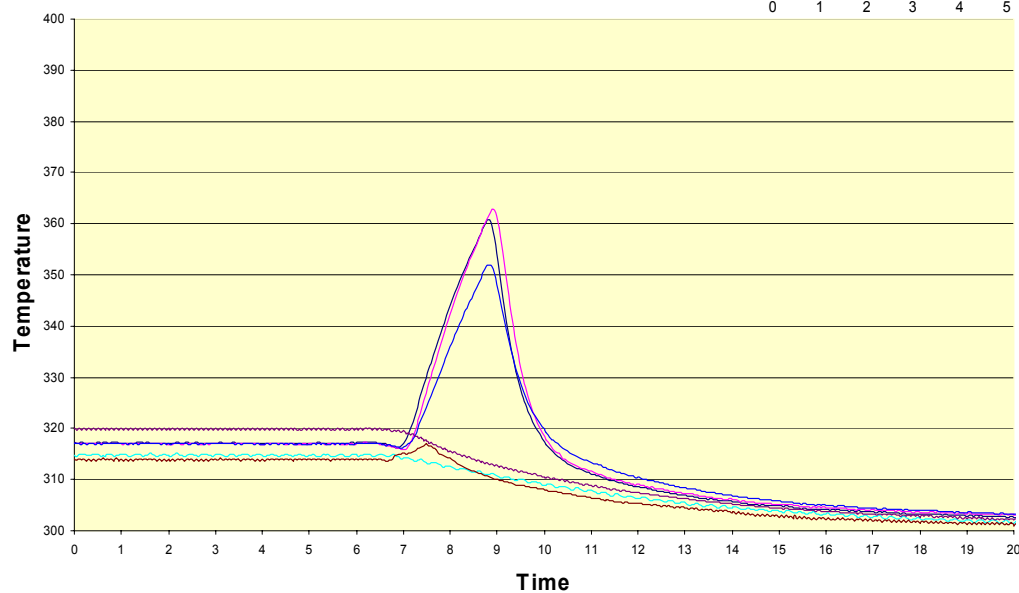
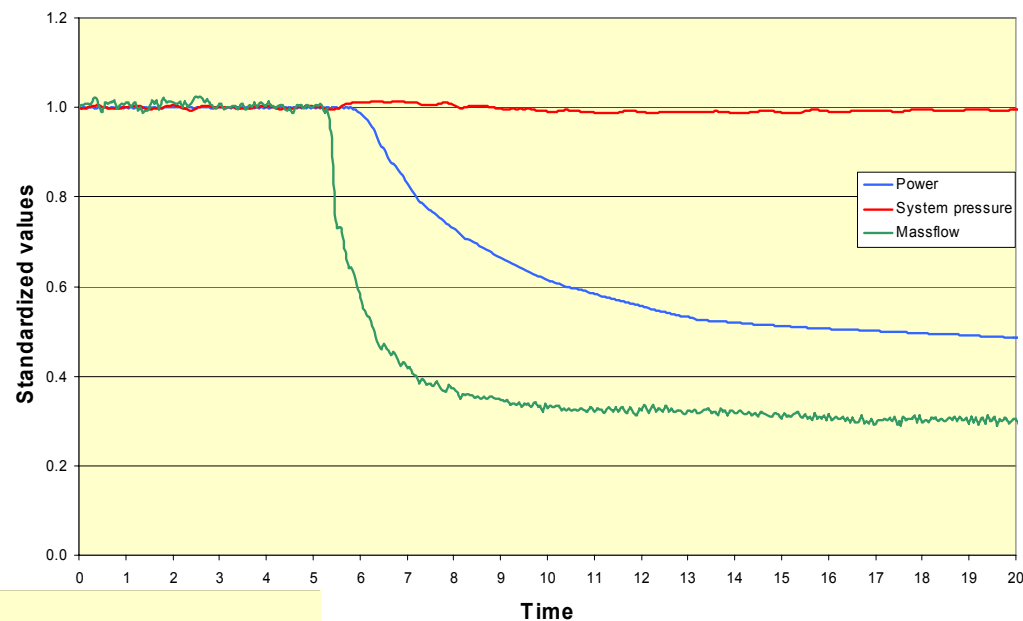
System data during turbine trip



Rod temperature response during turbine trip

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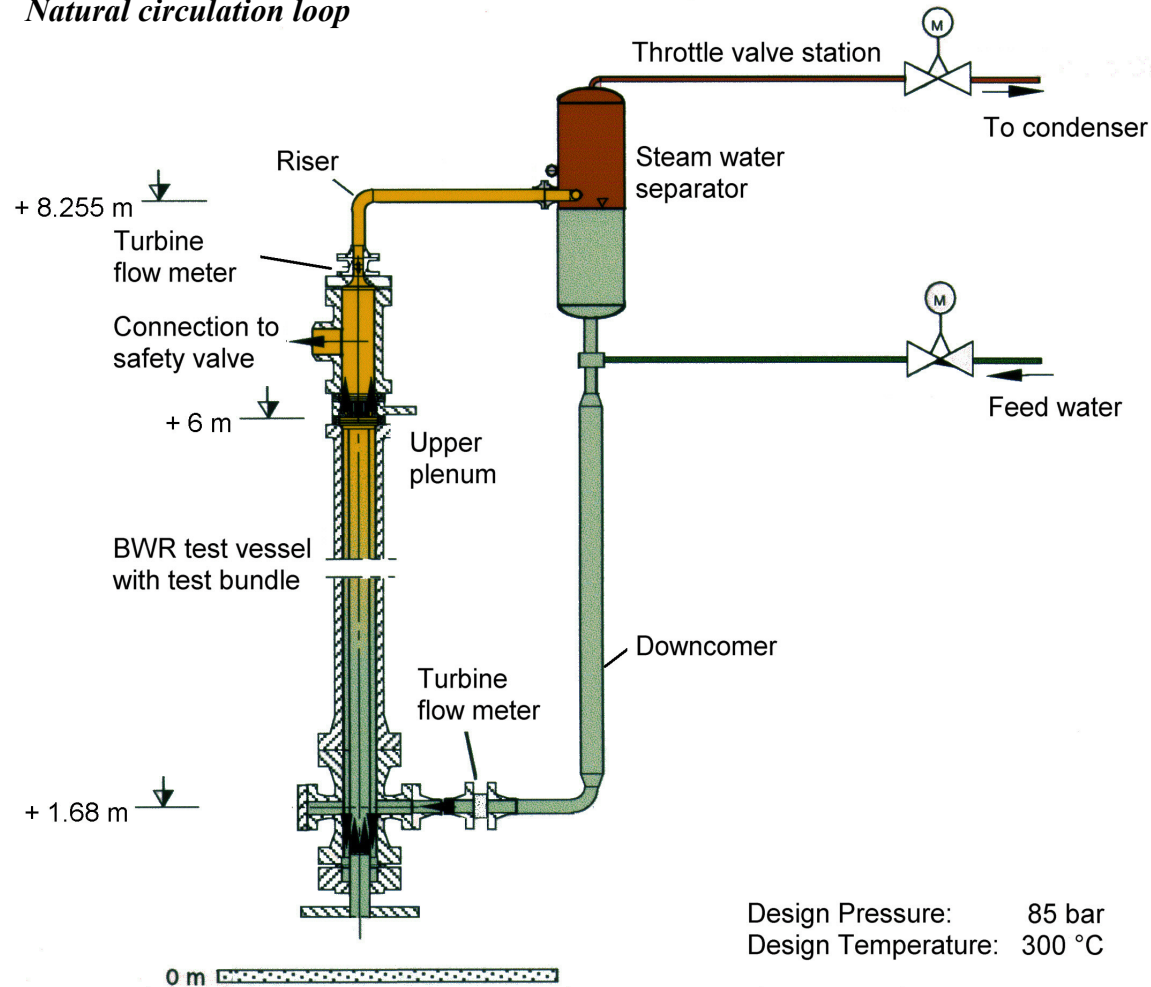
System data during pump trip



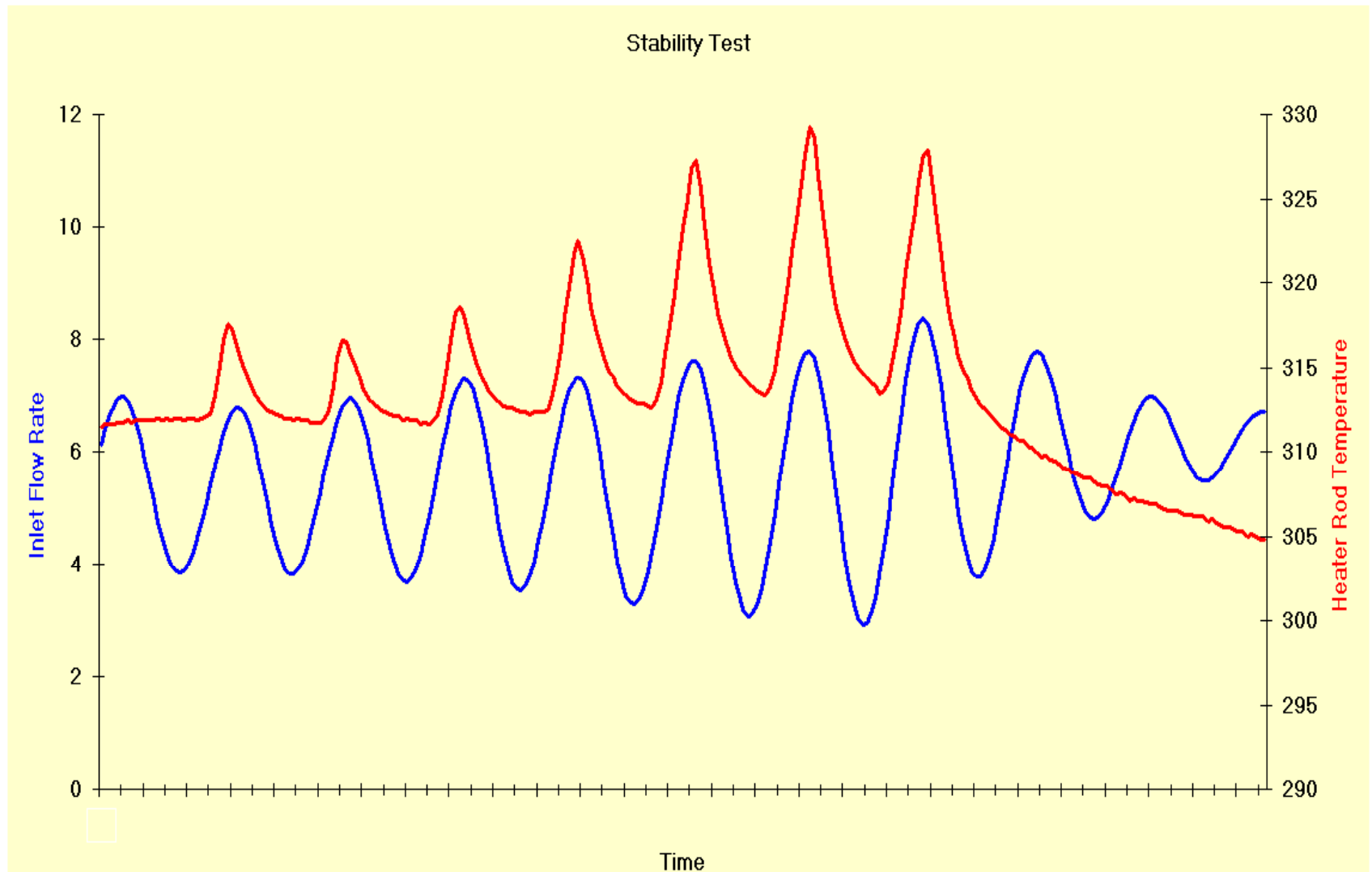
Rod temperature response during pump trip

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Natural circulation loop

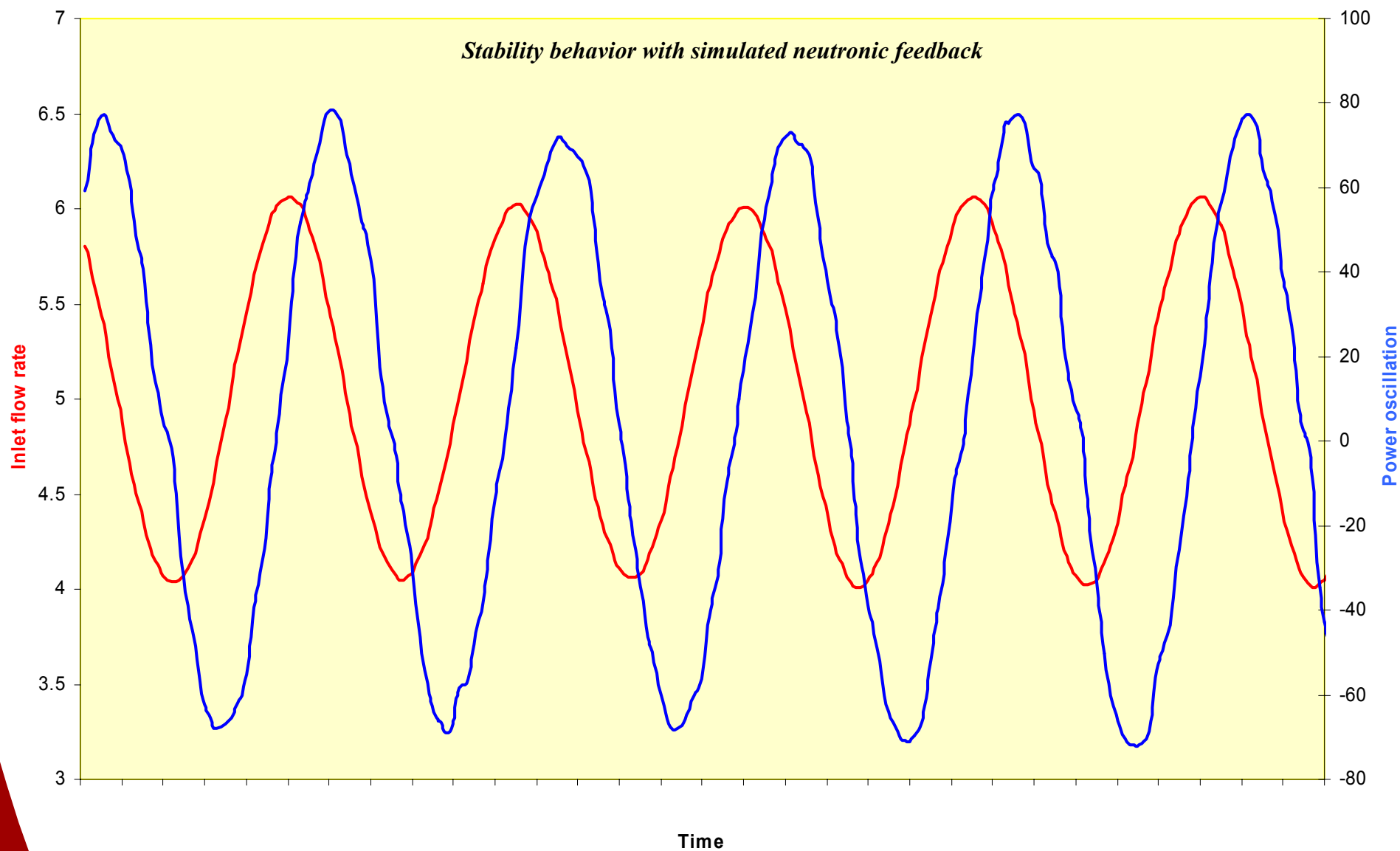


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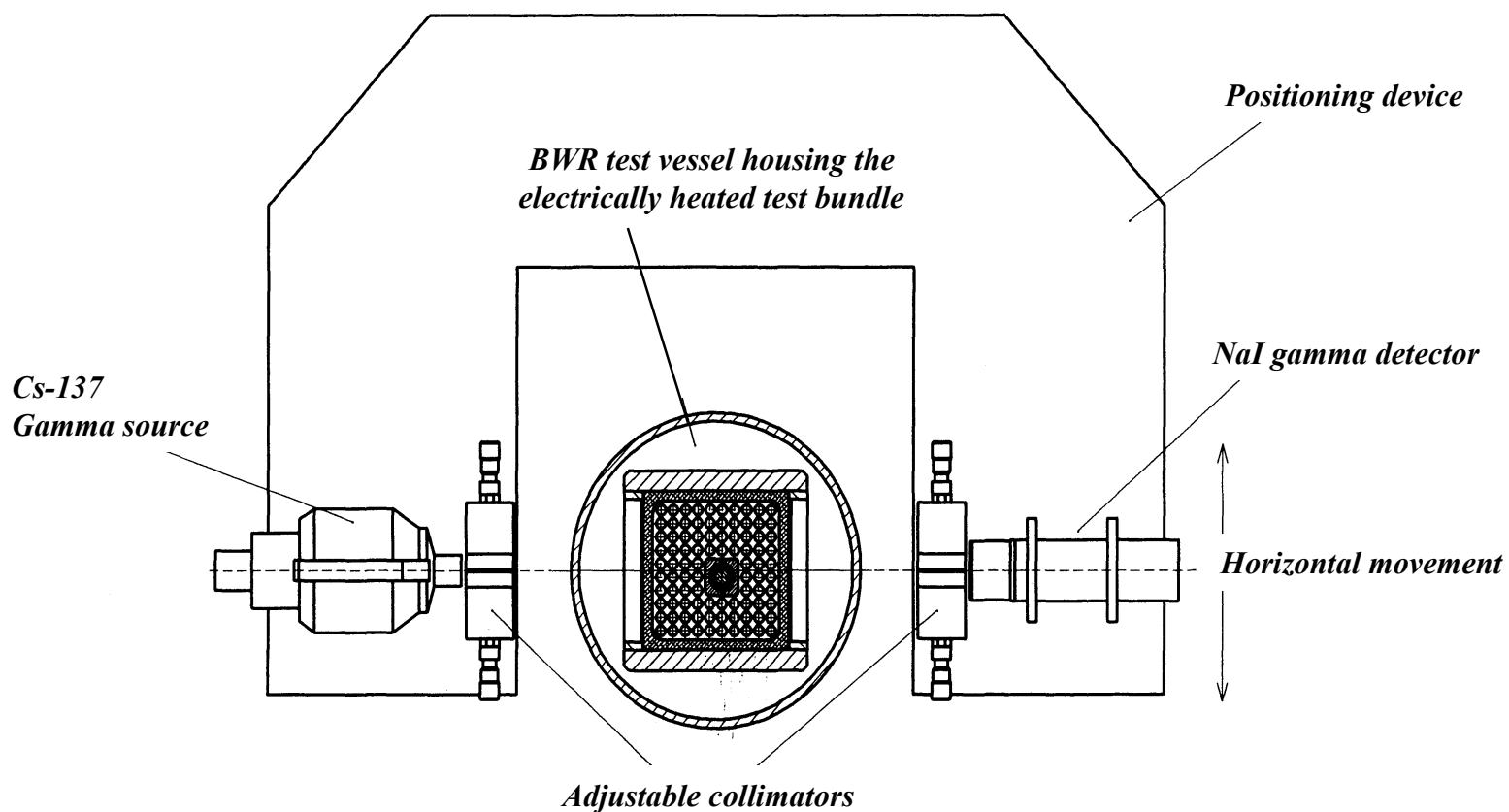


Transient dryout during instability

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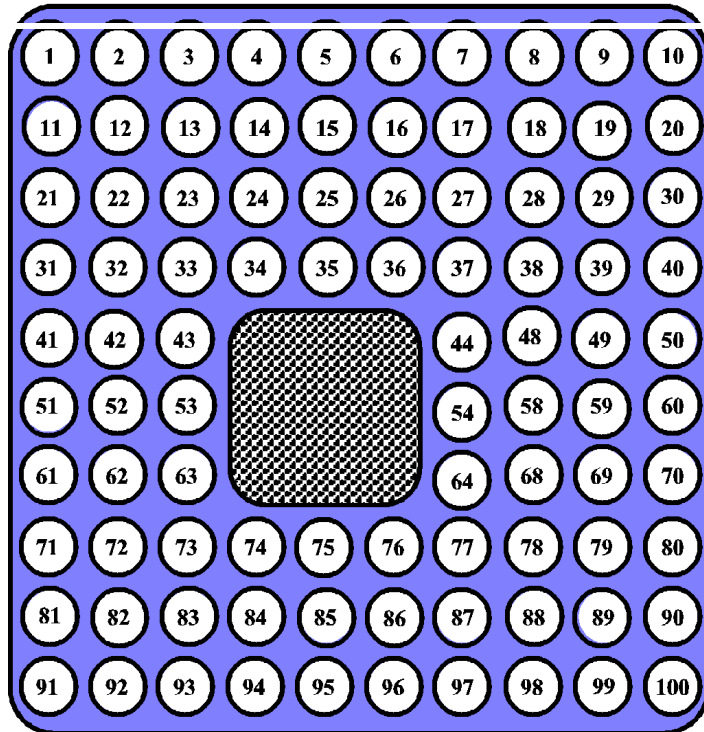


Critical Heat Flux Tests at the Multifunction Thermal Hydraulic Test Loop KATHY

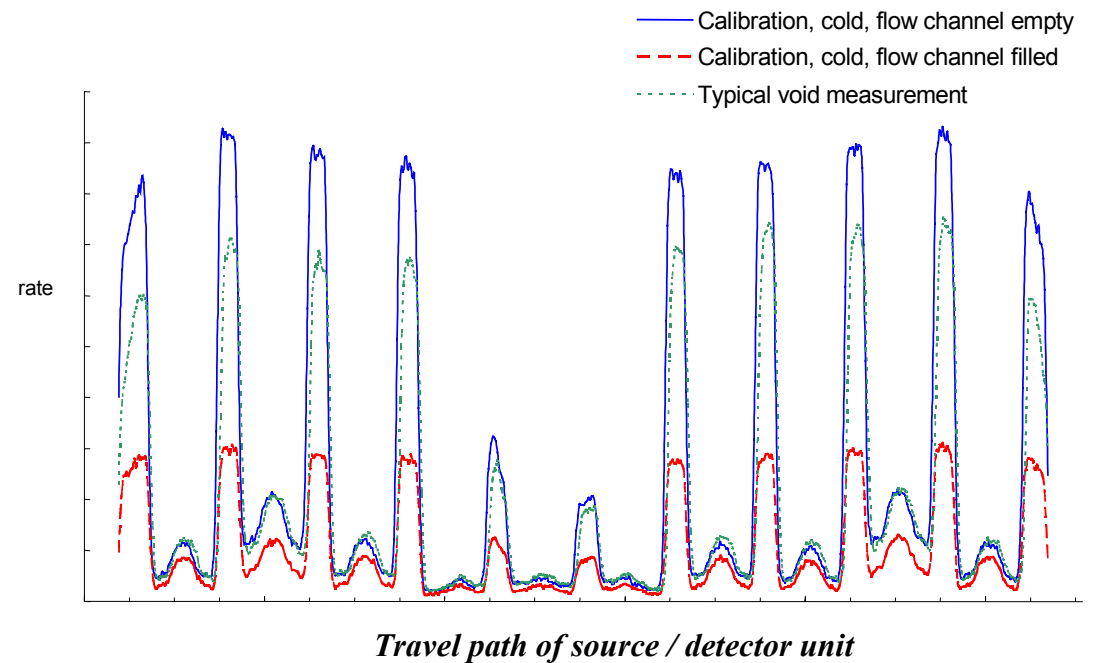


Karlstein void fraction measurement device - top view

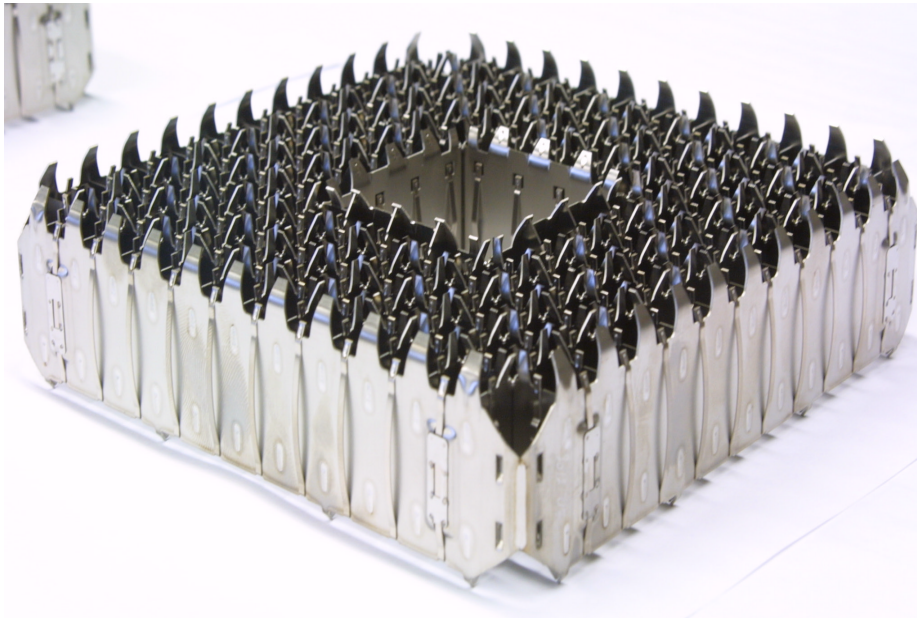
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Pulses typically counted over travel distance



Critical Heat Flux Tests at the Multifunction Thermal Hydraulic Test Loop KATHY



ATRIUM 12 TM Test spacer AH70



***ATRIUM 12 TM Test bundle:
Ready to be inserted into the Multifunction
Thermal Hydraulic Test Loop KATHY***

Technical Center - TGT3 Components Qualification Karlstein

Präsentationen NRC 24.06.2003 KATHY General Description

Conclusion

- Highly qualified personnel, state-of-the-art measuring techniques and many years of experience have made the KATHY Multi-Function Thermal-Hydraulic Test Loop in Karlstein into a test facility at which both steady-state and transient measurements of the thermal-hydraulic behavior of BWR and PWR fuel assemblies can be carried out to the highest of quality standards. These measurements form the basis for the thermal-hydraulic development and design of advanced BWR and PWR fuel assemblies made by Framatome ANP.