



Nuclear Safety in Europe

First Regulatory Conference

Session 2: Challenges and perspectives



Inspectorate of Housing Spatial Planning and
the Environment (VROM-Inspectorate)
Ministry of Infrastructure and Environment
Ministry of Economic Affairs, Agriculture
and Innovation
The Netherlands

Safety of Research Reactors.

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- research reactors in Europe (and world wide)
- safety for people and safety for patients
- stress test on research reactors



research reactors in Europe & world wide

sources of information

WENRA - enquiry

- research reactors under supervision of the WENRA regulatory bodies (nov. 2010)

IAEA data base

- “Nuclear Research Reactors in the World”
(www.iaea.org/worldatom/rrdb)



research reactors in Europe & world wide

reactor status

in operation

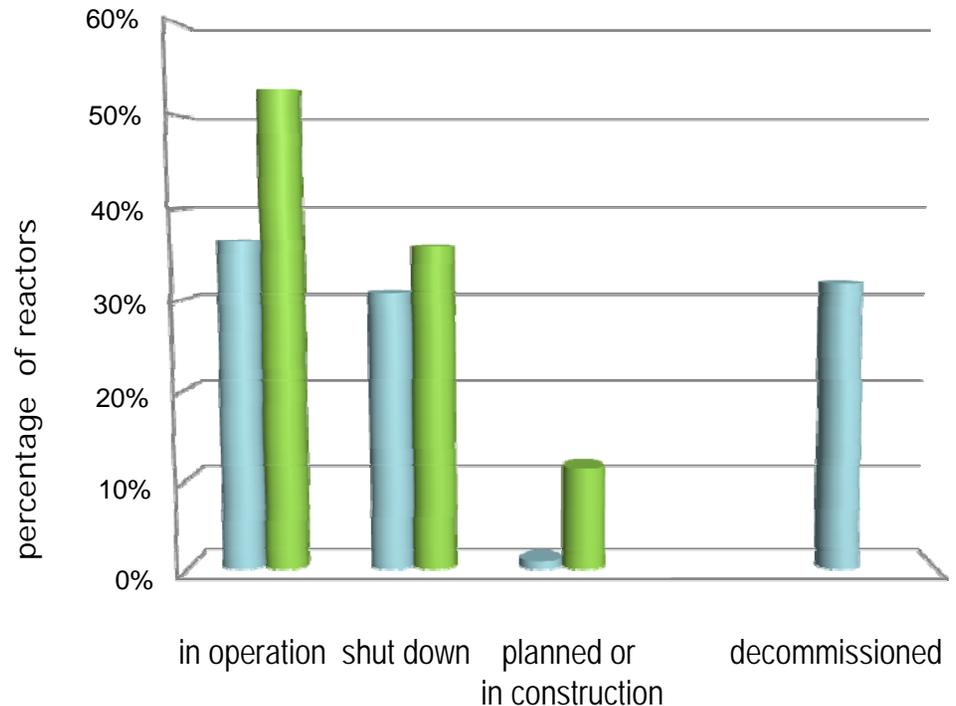
63 (E) **241 (ww)**

shut down

36% (E) **31% (ww)**

decommissioned

not incl. **32% (ww)**



(sources: **WENRA-enquiry** & **IAEA data base**)



research reactors in Europe & world wide

reactor age

in operation

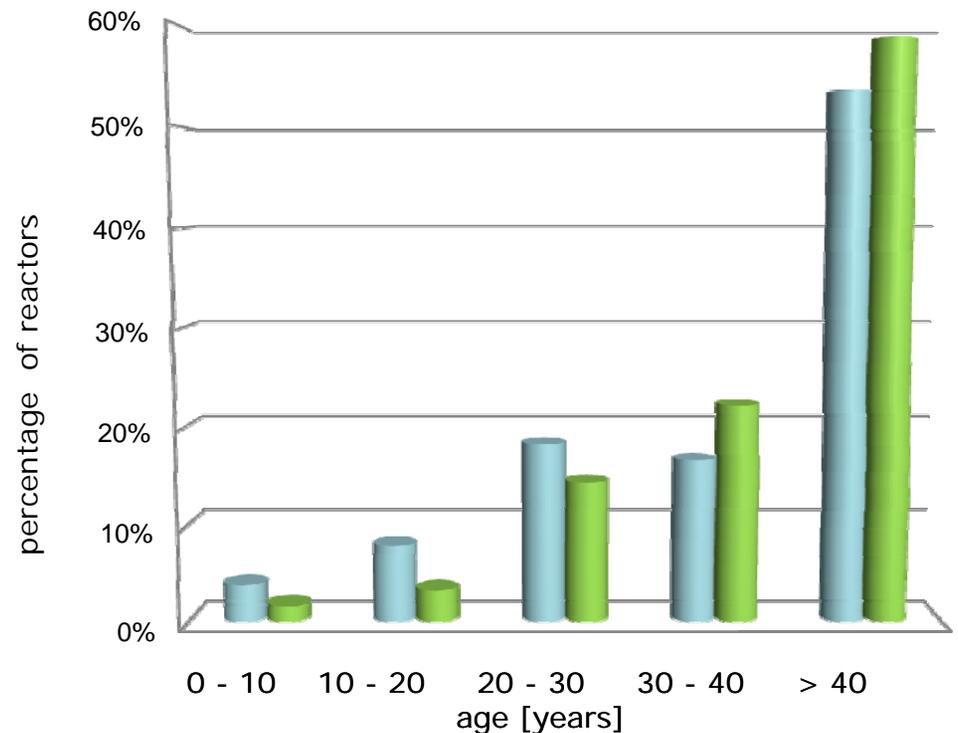
63 (E) **660 (ww)**

> 30 years

80% (E) **70% (ww)**

> 40 years

60% (E) **55% (ww)**



(sources: **WENRA-enquiry** & **IAEA data base**)



research reactors in Europe & world wide

most important safety issues

1. ageing
2. shut down reactors to be decommissioned

also

3. safety culture

Beware of “small reactor operated by scientists” -
complacency.



safety for people and safety for patients

the HFR-problem

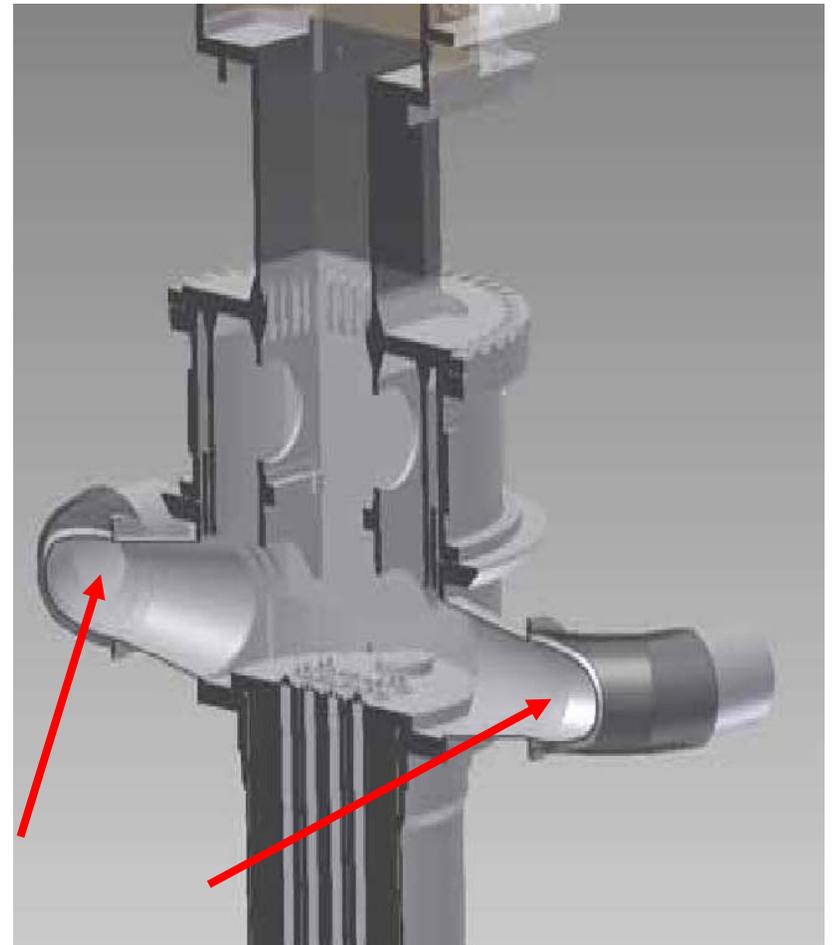
deformations and suspected leak

in the

reducer of the bottom plug liner

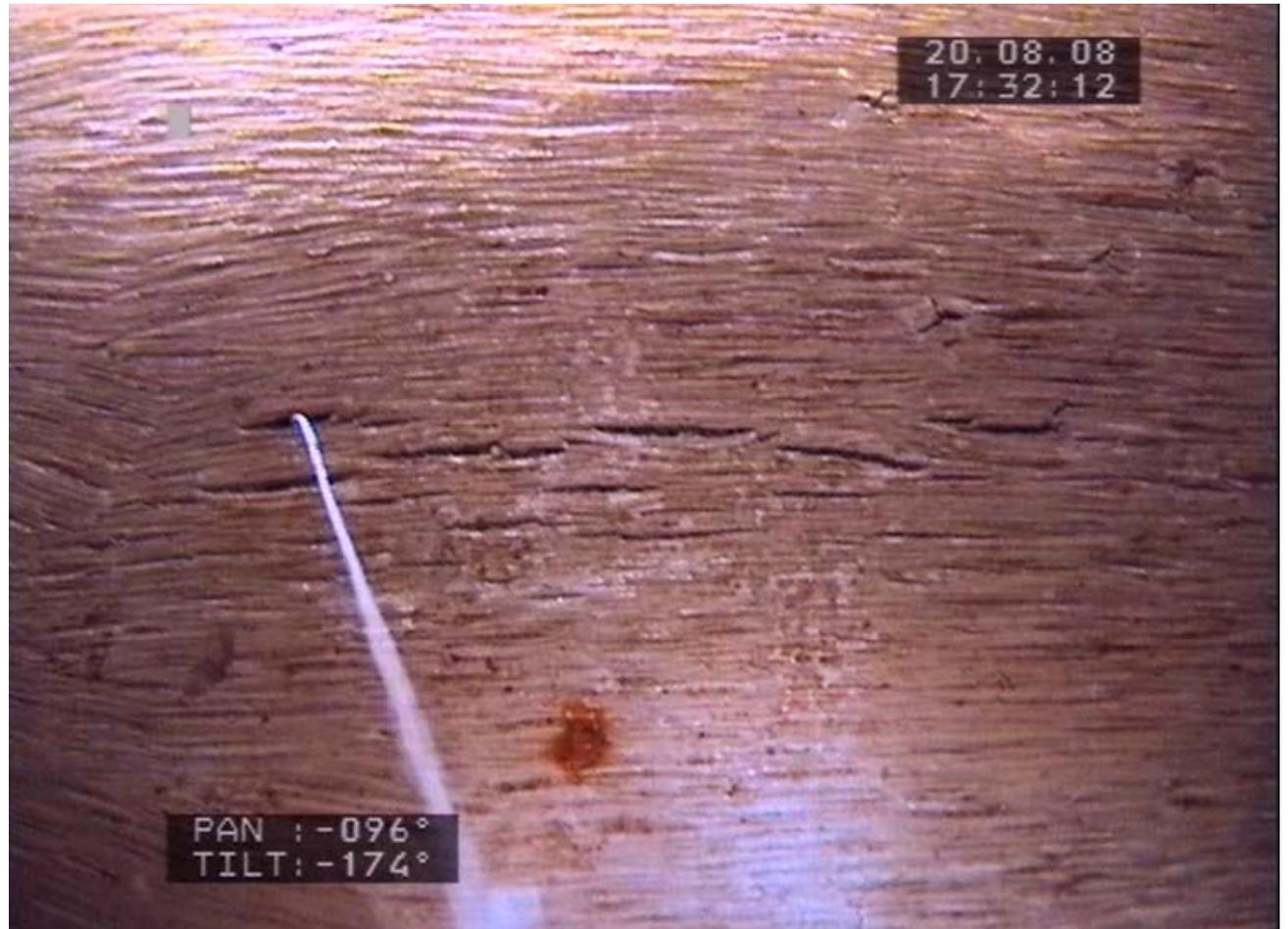
of the

primary cooling system





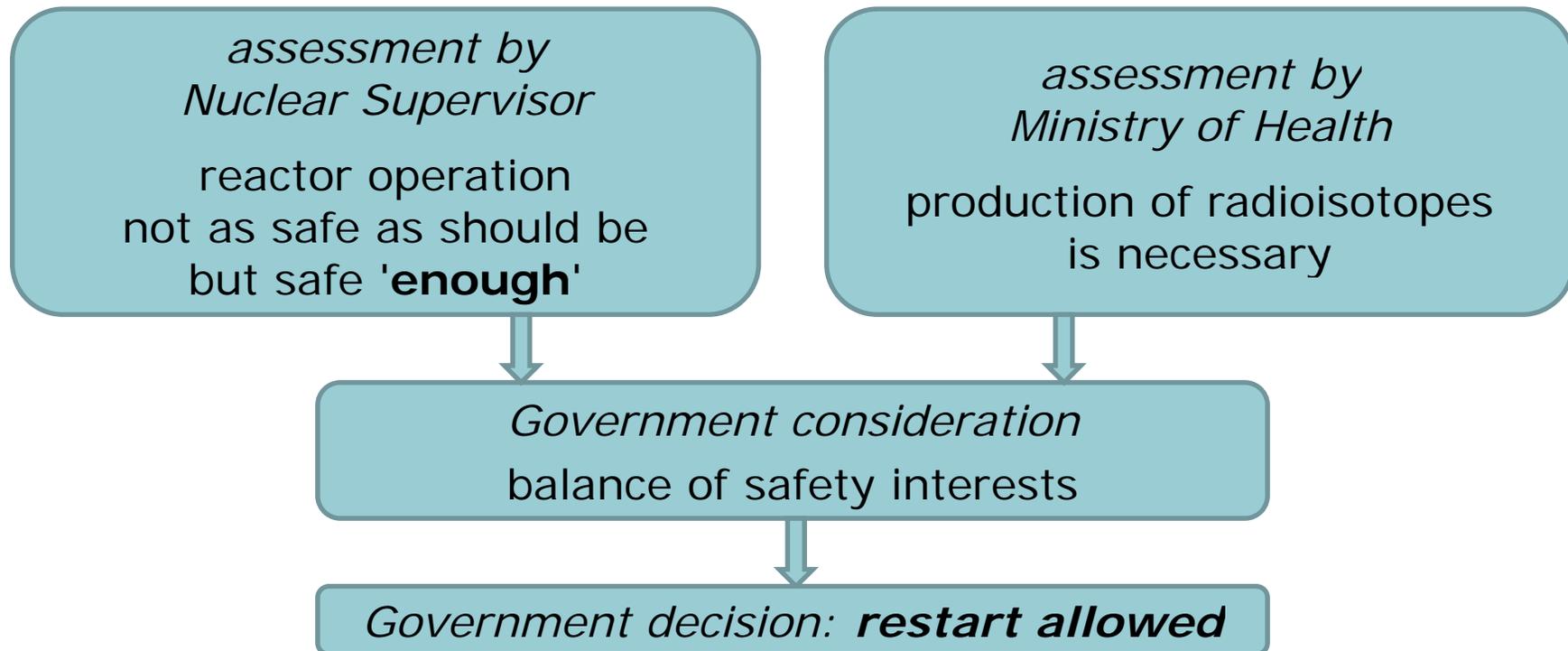
safety for people and safety for patients





safety for people and safety for patients

Governmental decision making proces





safety for people and safety for patients

Governmental decision making process

three golden rules:

- transparency
- peer scrutiny
- responsibility



safety for people and safety for patients

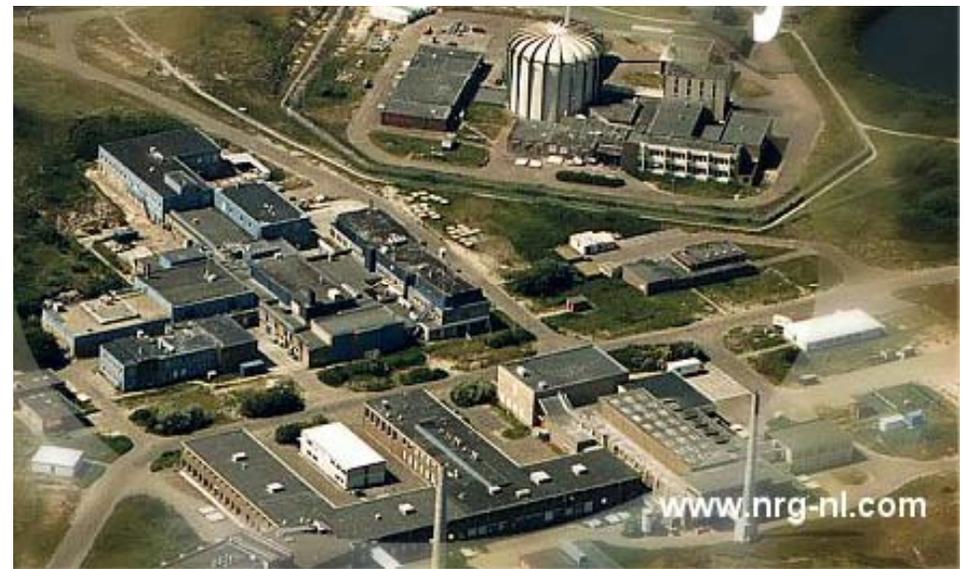
follow-up

- careful planning including setbacks and misfortunes
- February 2010: start repair
- September 2010: start repaired reactor (according to planning)
- reactor operates without significant problems for 15 months
- INSARR mission (March 2011) showed good results
- careful monitoring of the cooling continues



stress test on research reactors

- all nuclear reactors will be subjected to a stress test
- voluntary decision by the licensees
 - Petten: High Flux reactor (open pool, 50 MW_{th})
Low Flux reactor (Argonaut, 30 kW_{th})
 - Delft: University reactor (open pool, 3 MW_{th})





stress test on research reactors

Reasons to subject research reactors to stress test

- vicinity of other nuclear installations (Petten)
- vicinity of populated areas (Delft)
- flooding susceptible area



concluding remarks

- Important safety issues world wide with research reactors are the ageing of the reactors and the large number of shut down reactors, which are not decommissioned.
- In Petten the effects of ageing of the cooling pipes have been temporary overcome by successful repair; careful monitoring continues.
- The stress test on research reactors will lead to the identification of possible measures to improve nuclear safety of the reactors in operation
- Hopefully the stress test will also lead to real decommissioning of the many reactors in shut down state



THANK YOU FOR YOUR ATTENTION