

**From:** Undine Shoop  
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B-24

Briefing on the visit of the NRC Delegation to Germany

Safety Aspects of HTR Technology  
July 23-26, 2001

Undine Shoop and Amy Cabbage  
August 2, 2001

Participants of the NRC Delegation

Howard Faulkner - OIP

Undine Shoop - Reactor Systems Branch, NRR

Amy Cubbage - Future Licensing Organization, NRR

Stuart Rubin - Advanced Reactor Group, RES

Donald Carlson - Advanced Reactor Group, RES

Alex Murray - Special Projects Branch, NMSS

Vanice Perin - Special Projects Branch, NMSS (Observer)

## Agenda

### July 23 - GRS office in Cologne

- Overview of HTR programme in Germany (Westinghouse)
- Overview of Safety Assessment of HTR-Module (TUV Hanover)

### July 24 - FZJ, Research Center in Julich

- Overview of Research and Development and FZJ (FZJ)
- Fuel Element Irradiation and Post-Irradiation Examination for establishing the 1600 C fission product retention limit (FZJ)
- Fuel Element Research and Development and Production (NUKEM)

### July 25 - FZJ, Research Center in Julich

- Nuclear Graphite Research and Development and Production (FZJ)
- Heat Transfer and Fluid flow (FZJ)
- AVR Operational Experience (FZJ)
- THTR Operational Experience (FZJ)
- Core Physics and Pebble Flow (BFS)
- Tour of Intermediate storage Facility
- Short Visit to AVR

### July 26 - GRS office in Cologne

- Safety Assessment of HTR module (TUV Hanover)
- Safety Assessment of THTR (TUV Essen)
- Safety Issues during Licensing of THTR (Ministry for Economy)
- Rules and Standards (BFS)
- Know How Transfer to ESKOM (Westinghouse, FZJ)
- Waste Management (FZJ)

### HTR Development and Experience in Germany

#### AVR

Operated from 1966-1989

15 MWe

Research Reactor designed with Containment because it was prior to the development of TRISO fuel

Used to test fuel types

Shut down for political reasons

#### THTR

Operated from 1983-1989

300 MWe

First Prototype

Used in-core control rods which presented a problem

Used a core width to height ratio of 1:1, which also presented problems related to pebble flow

Shut down for political reasons

#### HTR Module

Designed and submitted for concept license, application withdrawn due to unfavorable political climate

200 MWe

Forerunner of PBMR

Safety assessment was complete

Experiments

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