

# **KNK-II Knowledge Preservation and Related Activities in Germany**

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## **Background of the IAEA Initiative on Fast Reactor Knowledge Preservation (FRKP)**

- **Resolution GC(47)/RES/10.B of the IAEA General Conference in September 2003**
- **Request of the General Conference to promote networking in a range of issues associated with nuclear knowledge**
- **In response to the needs of the Member States, the Agency started an initiative towards the implementation of a fast reactor data retrieval and knowledge preservation project**

## **Build-up of FR Knowledge in the Past**

**From 1960s on, three decades of important fast breeder reactor development programs**

- **Test reactors: Rapsodie, **KNK-II**, FBTR, JOYO, DFR, BR-10, BOR-60, EBR-II, Fermi, FFTF**
- **Commercial size prototype reactors: Phénix, Superphénix (SPX), SNR-300, MONJU, PFR, BN-350, BN-600**

## Challenge of Maintaining FR Knowledge

**From 1980s onward, decline of fast reactor programs (mostly for economical and political reasons):**

- **CRBR project cancelled, EBR-II and FFTF shut down**
- **SPX shut down, SNR-300 completed but not taken into operation, KNK-II shut down, PFR shut down**
- **BN-350 shut down**

# Challenge of Maintaining FR Knowledge (cont'd)

- In parallel (1990-2000), **retirement of experts peaked**, new hiring and student enrolment diminished;
- **Facilities** (e.g., hot cells, fuel fabrication lines, seismic test rigs, zero power critical assemblies, etc) **degrading or shut down.**

## IAEA Fast Reactor Knowledge Preservation Initiative

### Objective

Develop Knowledge Base into which existing KP Systems will be integrated and which will complement and integrate future Member States' efforts to preserve fast reactor data and knowledge

### Outcome

Widely used international Knowledge Base through Portal established and maintained by IAEA

IAEA's Contributions

Member States' Contributions

## IAEA's Contributions

- **Own fast reactor data and knowledge: 35 + years of activities within the frame of the IWG-FR/TWG-FR**
- **Creation of Fast Reactor Knowledge Preservation network**

## **IAEA's Contributions (cont'd)**

- **Support and coordination of FRKP in Member States (MS) through and with the help of the TWG-FR:**
  - **Mobilization of MS to take concrete action (e.g., IAEA fact finding missions)**
  - **Support experts**
  - **CRP's, and coordination meetings**
- **Development of fast reactor taxonomies**
- **Creation and maintenance of the Knowledge Portal**

## Member States' Contributions

- **Identification of fast reactor development, operation, and decommissioning data, and knowledge location**
- **Assessment of data and information quality and completeness, and degree to which it is endangered**
- **Conversion into a robust and secure electronic form**

## Member States' Contributions (cont'd)

- **Development of interpretive documents (define final state of affairs and its rationale)**
- **Preparation of bibliographical records, including index/keywords in close cooperation with INIS**
- **Facilitation of the provision of access to the information (not necessarily open release if commercial) within the international Knowledge Base to be administered and preserved by the IAEA**

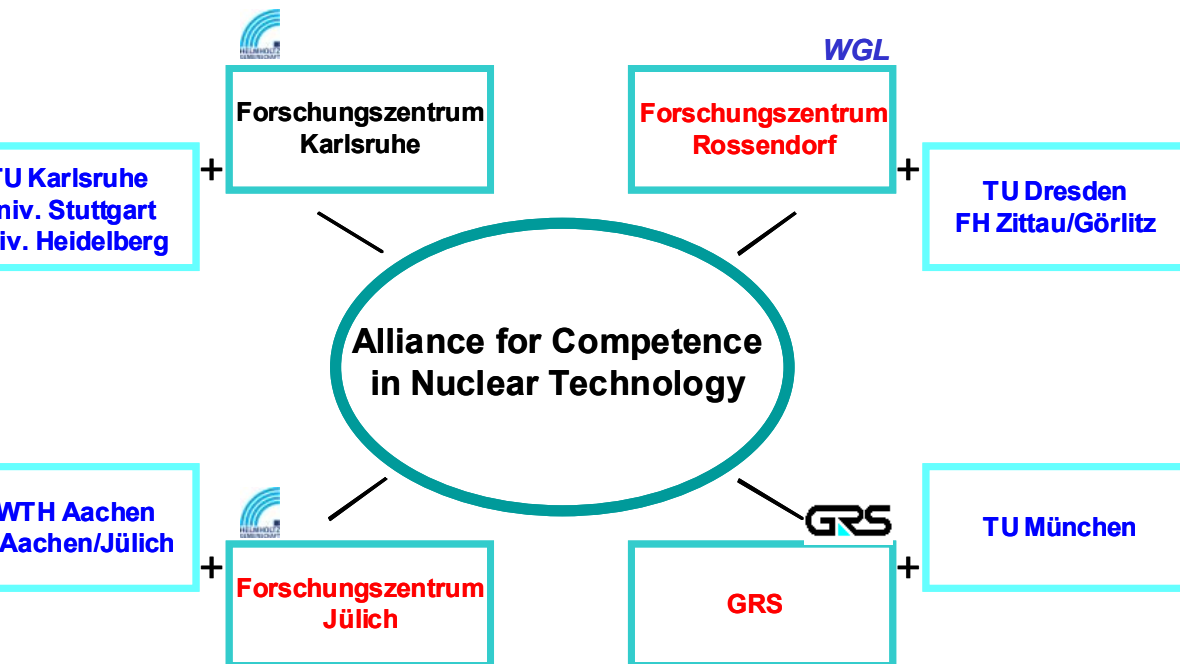
## To the Nuclear Situation in Germany

**It is well known that the present German energy policy is based on the phase-out of nuclear electricity generation.**

**But irrespective of the political decision, there is a consent that competence in nuclear safety needs to be maintained for the next decades.**

# Alliance for Competence in Nuclear Technology

- **Objectives:**
  - Coordination of Nuclear Safety Research in Germany
  - Definition of research topics
  - Quantification of staff required
  - Participation in International Projects



## Additional Participants

- Federal Ministries  
BMBF, BMU, BMWA
- Project Agencies  
PT-R, PTWt+E
- BGR, ITU, MPA
- German utilities

# KNK-II Plant at the Research Centre Karlsruhe



## KNK-II Design and Operational Data

- **Thermal/electric power**                      **58/20 (MW)**
- **Primary/secondary coolant**                **sodium**
- **Primary circuit configuration**            **loop**
- **Fuel in driver zone**                        **(Pu,U)O<sub>2</sub>**
- **Core <sup>235</sup>U/<sup>239</sup>Pu content**                **80/32 (kg)**
- **Maximum/average burnup**                **172/75 (GWd/t<sub>HM</sub>)**
  
- **KNK operations: 20 August 1971 – 21 August 1991**
- **Current status: being dismantled**

## Status of KNK II Knowledge Preservation Activities

- **Support for retrieval and archiving (using INIS capabilities) of data and information related to the German experimental fast reactor KNK-II**
  - **Information retrieved: ~500 documents evaluated/quality checked (sources: FZK, Siemens/FRAM ANP)**
  - **191 deemed worth preserving in electronic form**
  - **Bibliographic records created based on adapted INIS thesaurus**

## Status of IAEA Contributions

- **Work started on Knowledge Portal**
  - **Specifications defined**
  - **Indexing, hierarchies, taxonomies established**
  - **First off-line trial version implemented**

## Concluding Remarks

- **IAEA initiative on fast reactor knowledge preservation in response to expressed MS needs**
- **KNK II is first concrete step in the IAEA program, others to follow**
- **Goal: IAEA Fast Reactor Knowledge Portal (www based)**