mvm paksi atomerőmű

# The Maintenance Training Center of Paks NPP as a unique facility in the international co-operation

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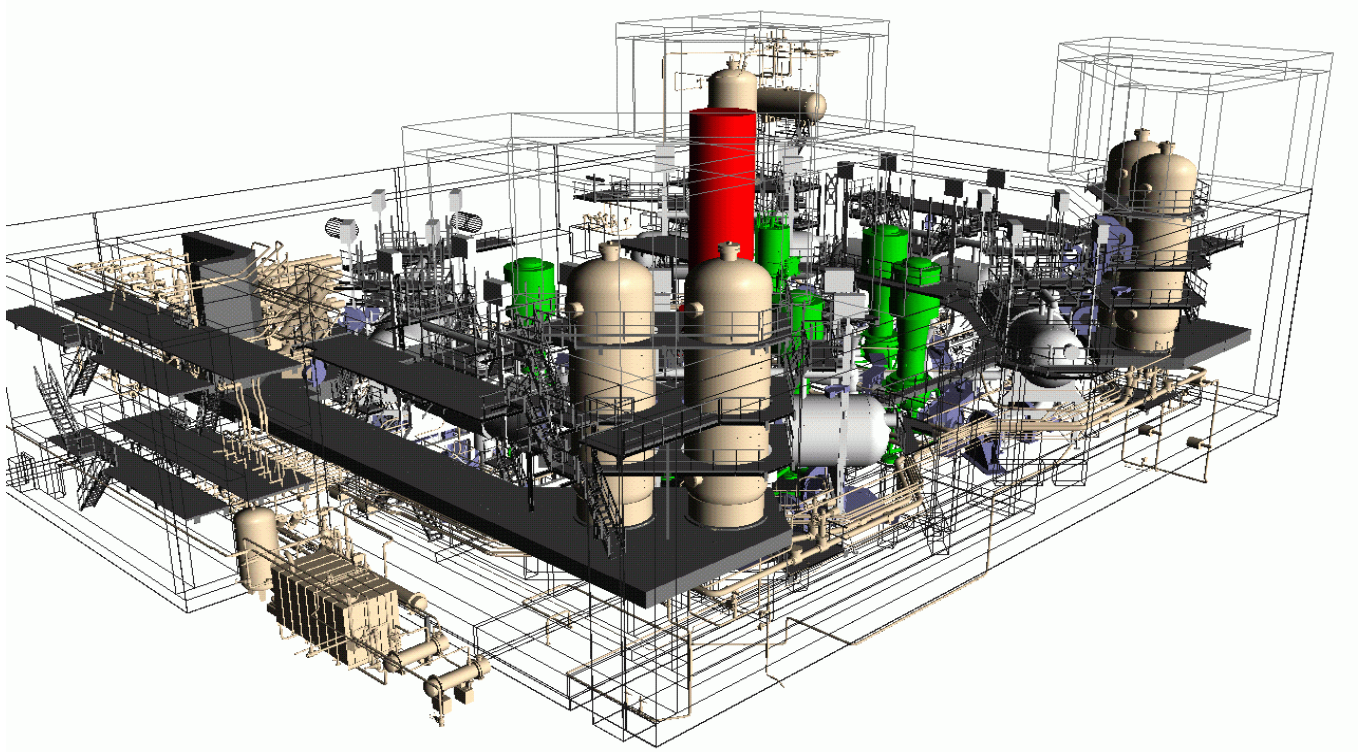
- Introduction of Paks NPP
- The training system of Paks NPP
- Paks NPP playing role in training-related international cooperation
- Hungary playing role in training-related international cooperation

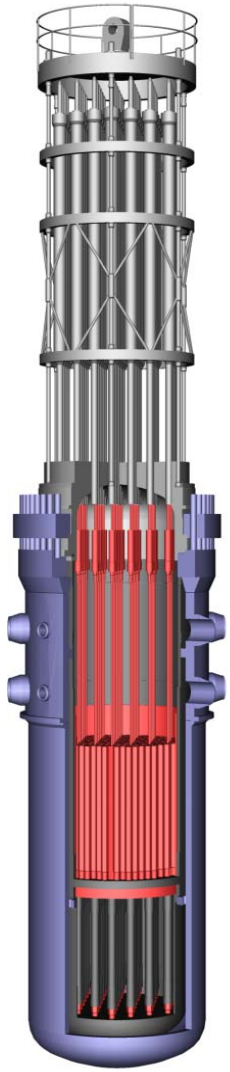
# Introduction of Paks Npp

- The only commercial nuclear facility in Hungary
- Operated by the Paks NPP Ltd., a member of the MVM holding
- State ownership

# Introduction of Paks Npp

- 4 units - WWER-440 design
  - 1982, 1984, 1986, 1987
- Second generation, safe model
- Continuous upgrading
  - good production and safety indicators





# Introduction of Paks Npp

## A promising vision:

- High public acceptance (77%)
- Power uprating finished (+ 8% - 500MW/unit)
- Service time extension (+20 years, 2032-37) under licensing
- Preparation for constructing two new units in progress

# Training system of Paks Npp

- A powerful, self supplying training system and infrastructure
- Corporate training organization
- A significant system of relations with universities and scientific institutes
- Good international relationships

# Training system of Paks Npp

## The role of the training organization:

- To operate and upgrade the training infrastructure
- To develop and maintain training programs
- To train the corporate staff (2400 staff members)
- To train the full time contracted employees (1000 persons)
- To develop managers' KSAs (knowledge, skills, attitudes)
- To keep contact with institutes of the middle- and higher education
- To keep international contacts in the field of training
- To provide services (organizer and host training, events, conferences, receiving visitors)

# Training system of Paks Npp

## Training organization

- A department within the Human Resources Division with 50 staff members

  - instructors, developers, program organizers
- 70 instructors and tutors

  - 20 full time, 50 part time lecturers

# Training system of Paks Npp

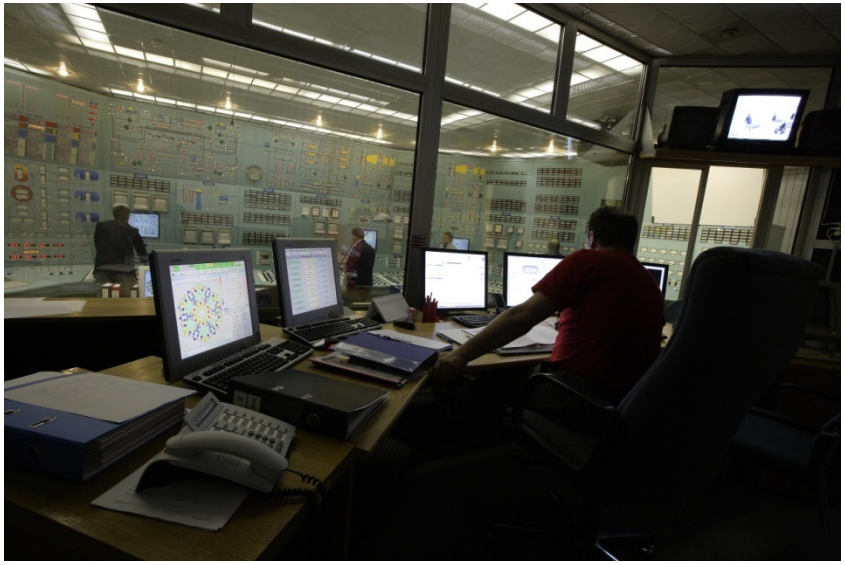
## Training infrastructure:

- Two training buildings on site
  - Operations (1986) training center with simulator
  - Maintenance Performance Improvement Center MPIC (1997)
- Secondary Vocational High School and Campus specializing in Energetics – Paks (1986)

# Simulator

- Constructed between 1985-1987 (Nokia –KFKI)
- On-going upgrading programs (KFKI, Paks NPP)
  - to meet increasing expectations in scope and fidelity
  - hw, sw upgrading
  - functional extensions
  - tracing plant modifications
- Important development and testing environment
  - digital reactor protection system
  - I&C (balance of plant) reconstruction

# Full-scope replica simulator



# Training system of Paks Npp

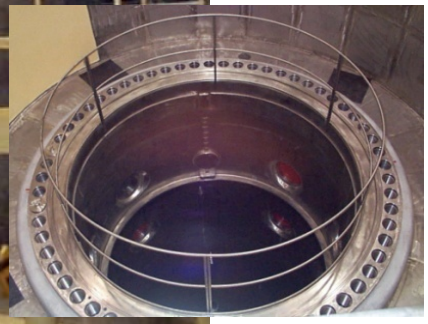
## MPIC

- Built between 1995-97, in frame of an IAEA, Phare project
- Almost unique in a global scale:
  real large equipment (reactor vessel, steam generator), for training purposes
  complete, SAT-based maintenance training programs

## Role:

- Training of the corporate and contractors' maintenance staff
- Development and testing of maintenance tools, technologies
- Training of non-domestic maintenance staff
- PR – visitors, conferences, events

# MPIC



# Paks Npp role in international co-operations

**Paks is grateful for the international training-related support provided in the 1990s**

**As a return Paks has always been open to share its knowledge, training experiences and capacities with others:**

- **Hosting role in IAEA events**
- **Receiving IAEA fellows and scientific visitors**
- **Providing training services in frame of IAEA projects**
  **(Ukrainian, Armenian, Chinese)**
- **Bilateral relation with VGB of Germany**
  **(basic training of maintenance instructors)**
- **Bilateral relation with Loviisa NPP of Finland**
  **(SAT-based training development)**

# Role to play in the future:

- Providing training services for maintainers and maintenance instructors
- Playing expert role in training-related international projects
- Participating in development of training programs, training tools and materials
- Leasing the unique training space and equipment
- Hosting – conferences, events

# Hungary role in international co-operations

**Hungary offers 50 years' experiences in nuclear education and research as well as**

**30 years' experiences of nuclear operations for countries that are new into building an own nuclear industry**

## Co-operating partners:

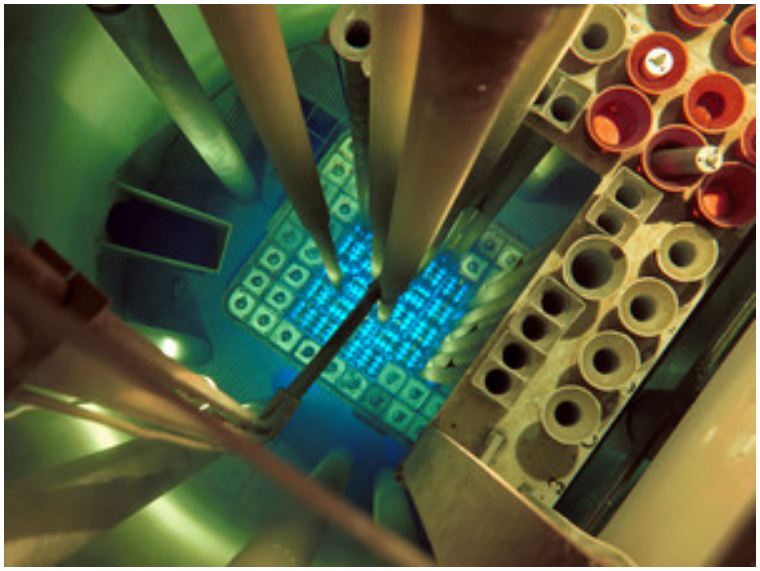
- Paks Nuclear Power Plant Ltd.
- Budapest University of Technical and Economic Sciences – Institute of Nuclear Techniques
- Hungarian Academy of Sciences – Central Research Institute for Physics – Institute of Nuclear Power Research (KFKI AEKI)

# Budapest University of Technical and Economic Sciences – Institute of Nuclear Techniques

- The most traditional and largest technical university in Hungary
- Education on nuclear sciences since the 50s
- Important role in education of professionals for the energy/nuclear industry and in nuclear-related research activities

# Budapest University of Technical and Economic Sciences – Institute of Nuclear Techniques

- Operating a study reactor since 1971
- The study reactor is an essential education space for engineers in the energy industry and for engineer-physicists



# Hungarian Academy of Sciences
# Central Research Institute for Physics
# Institute of Nuclear Power Research

- The most essential player in the Hungarian nuclear research activities
- A leading role in the foundation of the safety upgrading measures in Paks NPP

# Hungarian Academy of Sciences
# Central Research Institute for Physics
# Institute of Nuclear Power Research

- Operating a research reactor since 1959
- 10 MW power
- Acts as a high performance neutron source for scientific and applied research activities

# Hungary role in international co-operations

## Hungary

- is a committed promoter of sustainable development and environment friendly energy production
- supports activities of countries new to the industrial use of nuclear energy
  - with its own means - wishes to participate in the success of these efforts
  - among others – offers its existing capacities for the education and training of professionals in other countries.

## Training opportunities

- Basic-, 1-12 week long training programs aimed at transfer of general nuclear engineering knowledge and practice.
- Training programs aimed at transfer of special nuclear knowledge

# Hungary role in international co-operations

1. **Basic-, 1-12 week long training programs aimed at transfer of general nuclear engineering knowledge and practice**

- **Duration (1-12 weeks) and content tailored to individual needs**
- **Organized by: Budapest University for Technical and Economic Sciences**
- **Proposed content:**
  - **Nuclear energy production, basic principles of radiation protection, operating principles of nuclear power plants, basic concepts of nuclear safety**
  - **Measurement and operating lab activities on the study reactor of the Budapest University for Technical and Economic Sciences, on the research reactor of the Central Research Institute for Physics, on the main components of the Maintenance Performance Improvement Center of the Paks NPP and demonstration exercises on the Paks NPP full-scope replica simulator**

## 2. Training programs aimed at transfer of special nuclear knowledge

- Duration and content tailored to individual needs
- Proposed content:

  the Budapest University for Technical and Economic Sciences, the Central Research Institute for Physics and the training center of the Paks NPP offers training programs assembled according to specific interests in any nuclear subjects; including scientific and applied engineering studies and topics in relation with nuclear power operations, maintenance and personnel training.

## Hungary's expectations of international cooperation

- Utilizing existing available nuclear education and training capacities
- Supporting the domestic nuclear extension program by building international relations and utilizing the experiences gathered

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# Köszönöm figyelmüket!

# Thank you for your attention