Cooperation between the IAEA and the Czech Republic in the Field of Decommissioning of Nuclear Facilities and Spent Fuel Management

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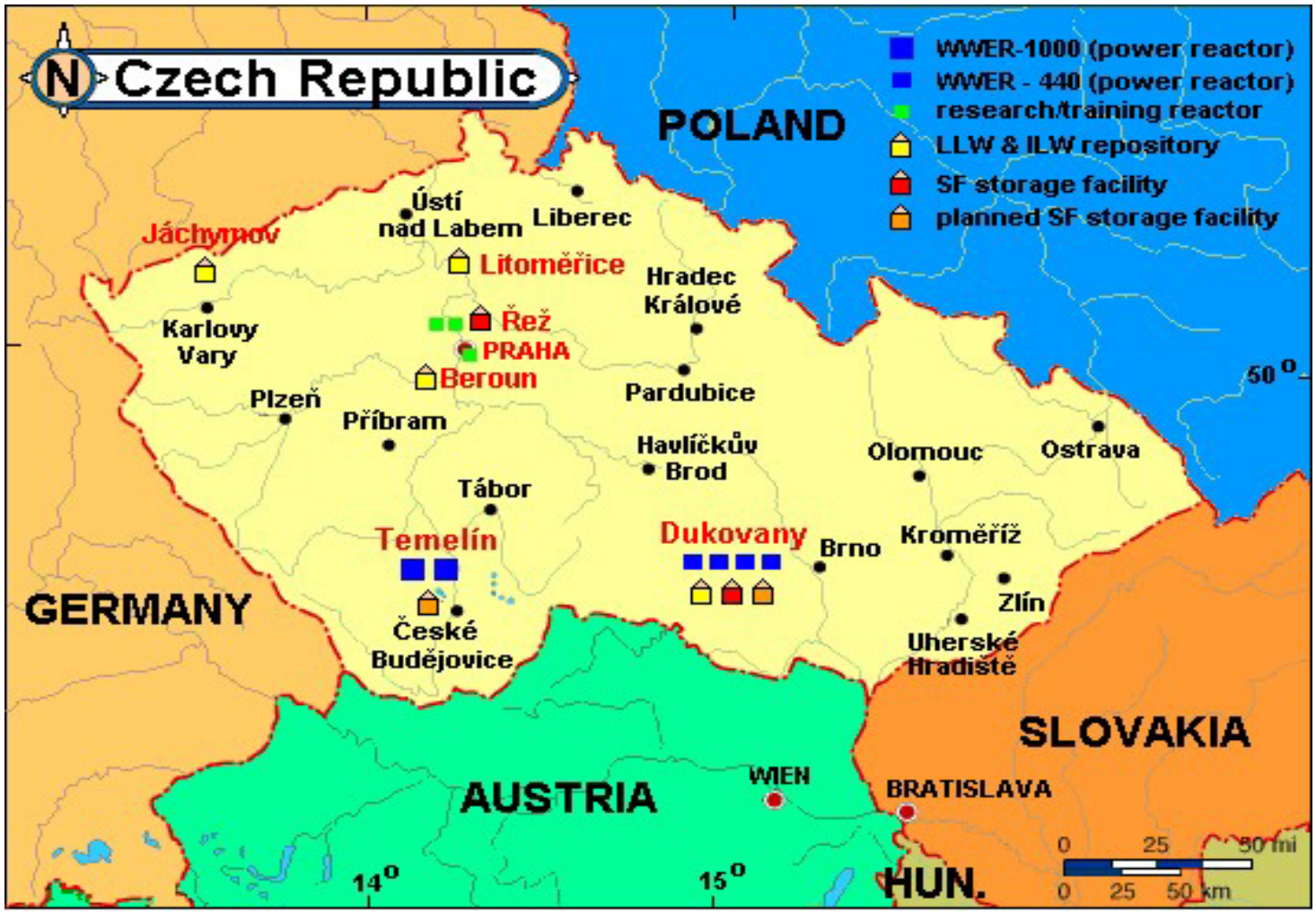
1. INTRODUCTION



Nuclear Map of the Czech Republic

1. INTRODUCTION (cont'd)

	Type of reactor	*Operator*	*Year of start-up*	*Year of Shut-Down*	*Status*
NPP Dukovany	**4 × VVER 440/213**	**ČEZ a.s.**	**1985 – 1987**	**2025 - 2027**	**in operation**
NPP Temelín	**2 × VVER 1000/320**	**ČEZ a.s.**	**2001 – 2002**	**2041 - 2042**	**in operation**
Research Reactor LVR-15	**tank reactor 10 MW_{th}**	**NRI Řež plc**	**1957 (VVR-S) 1989 (LVR-15)**	**2018**	**in operation**
Experimental Reactor LR-0	**zero power reactor**	**NRI Řež plc**	**1972 (TR-0) 1982 (LR-0)**	**2013**	**in operation**
Training Reactor VR-1	**zero power reactor**	**CTU Prague**	**1990**	**2020**	**in operation**
Research Reactor ŠR-0	**zero power reactor**	**ŠKODA Nuclear Machinery**	**1970**	**1989**	**decommissioned (1997)**

Nuclear facilities (reactors) in the Czech Republic

2. AREAS OF COOPERATION

- Cooperation in the field of SNF management (GTRI program)
- International Decommissioning Network (IDN)
- Coordinated Research Projects (CRP)
  - Innovative and Adaptive Technologies in Decommissioning of Nuclear Facilities
  - Planning, Management and Organizational Aspects in Decommissioning of Nuclear Facilities
- Regional Technical Cooperation Projects
  - Regional TC project RER/9/058 „Safety Review of Research Reactor Facilities“
  - Regional TC project RER/3/005 „Support for Decommissioning of Nuclear Power Plants and Research Reactors“
  - Regional TC project RER/3/009 " Support for Decommissioning of Nuclear Power Plants and Research Reactors (PHASE II)“

3. GTRI PROGRAM

- Shipment of SNF to Russian Federation for reprocessing in the frame of Russian Research Reactor Fuel Return (RRRFR) program under the US-Russian Global Threat Reduction Initiative (GTRI).
- 10 casks (for HEU SNF) purchased by the US Administration through IAEA and provided to the NRI.
- Participation of the NRI in shipments from other countries (incl. casks providing)
  - Bulgaria and Hungary (2008),
  - Ukraine and Poland (2009).
  - Serbia (2010).
- Implementation of the shipment of the residue of HEU SNF from the NRI (133 FAs) in 2015.
- More details in the presentation No. 9422 (Session 48).

3. GTRI PROGRAM (cont'd)

ŠKODA VPVR/M cask in ISO container

4. INTERNATIONAL DECOMMISSIONING NETWORK (IDN)

- Good forum for exchange of information.
- Participation in workshops, training courses – sharing the decommissioning experience, application of best practices, visits to decommissioned facilities, etc.

5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (2004-8)

- **Process of Selection of Suitable Technology for Decommissioning Activities**
  - One of the most important aspects of the decommissioning activities.
  - The selection of methods has a large impact on the whole decommissioning process, e.g. radiation protection, RAW management, and on the cost of decommissioning.
  - The real process of the selection of suitable technology and its application for remediation of old environmental liabilities in the NRI can serve as a source of information for establishing methodologies for the selection and comparison of technologies for decommissioning.
- **Described in TecDoc No. 1602**

5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Old evaporator (lower part)

5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Heater before dismantling

5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Dismantling with a nibbler

5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Segmentation of concrete monolith

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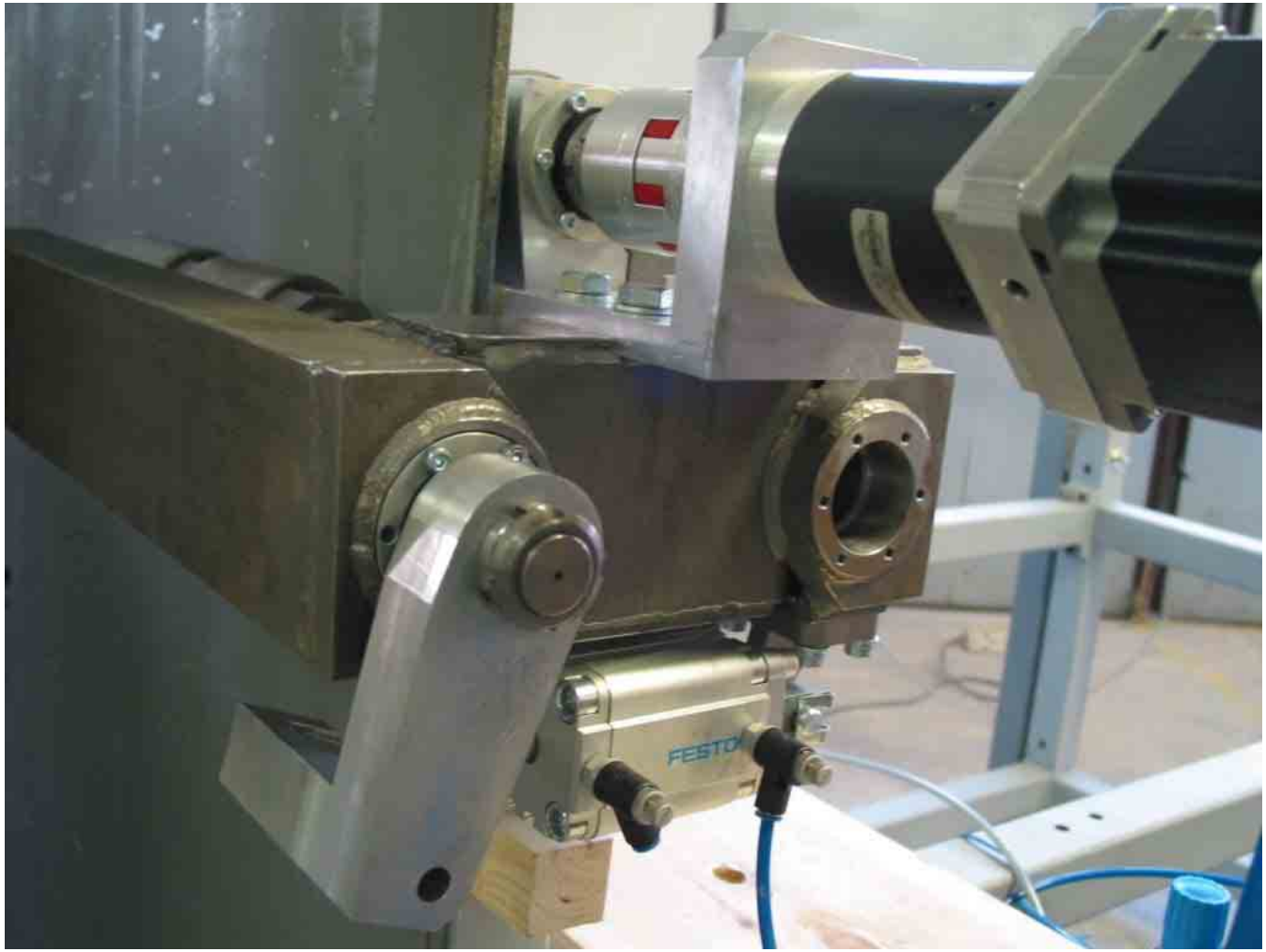
5. CRP: INNOVATIVE AND ADAPTIVE TECHNOLOGIES IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)



Device for mechanical milling

6. CRP: PLANNING, MANAGEMENT AND ORGANIZATIONAL ASPECTS IN DECOMMISSIONING OF NUCLEAR FACILITIES (2008-10)

- **Preliminary planning of decommissioning of research reactors**
  - **The process of updating the preliminary decommissioning plans of research reactors and the results.**
  - **New circumstances having wide impact on the decommissioning planning:**
    - **Shipment of spent fuel for reprocessing**
    - **Preparation of processing of RAW from reconstruction of the VVR-S research reactor (now LVR-15 research reactor) – source of information for planning of the LVR-15 reactor decommissioning).**

6. CRP: PLANNING, MANAGEMENT AND ORGANIZATIONAL ASPECTS IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Removing of VVR-S reactor vessel

6. CRP: PLANNING, MANAGEMENT AND ORGANIZATIONAL ASPECTS IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Stored VVR-S research reactor vessel

6. CRP: PLANNING, MANAGEMENT AND ORGANIZATIONAL ASPECTS IN DECOMMISSIONING OF NUCLEAR FACILITIES (cont'd)

Stored RAW from the VVR-S research reactor reconstruction

7. REGIONAL TC PROJECT RER/9/058 „SAFETY REVIEW OF RESEARCH REACTOR FACILITIES“ (2003-6)

- **Outcomes**
  - Planning for decommissioning and Decommissioning
  - Training and building competence on decommissioning
  - Focused on future assistance on planning – preliminary or detailed decommissioning plans
- **Participation in the expert mission to Budapest Training Reactor (Drafting of preliminary decommissioning plan).**

7. REGIONAL TC PROJECT RER/9/058 „SAFETY REVIEW OF RESEARCH REACTOR FACILITIES“(cont’d)

View of the Budapest training reactor

8. REGIONAL TC PROJECT RER/3/005 "SUPPORT FOR DECOMMISSIONING OF NPPs AND RRs“ (2007-8)

- **The main goals**
  - **to assist Member States in developing adequate strategies and plans for decommissioning consistent with IAEA recommendations,**
  - **to facilitate the exchange of information, experience and lessons learned among Member States,**
  - **to increase the competence of experts involved in decommissioning these facilities.**

8. REGIONAL TC PROJECT RER/3/005 "SUPPORT FOR DECOMMISSIONING OF NPPs AND RRs“ (cont’d)

- The Czech Republic shared the experience obtained from the planning of the decommissioning of the LVR-15 research reactor.
- The main objectives of the participation
  - Assistance and exchange of knowledge and experience in the field of planning the decommissioning of research reactors (preparation of preliminary decommissioning plan (PDP)).
  - Assistance to other participants in spent fuel storage, packaging and shipping.
  - Participation in Expert Missions related to preparation of PDPs (Uzbekistan).

8. REGIONAL TC PROJECT RER/3/005 "SUPPORT FOR DECOMMISSIONING OF NPPs AND RRs“ (cont’d)

VVR-SM Reactor in Uzbekistan

9. REGIONAL TC PROJECT RER/3/009 "SUPPORT FOR DECOMMISSIONING OF NPPs AND RRs (PHASE II)“ (2009-11)

- **Continuation of the RER/3/005 project.**
  - **It will be very useful with regard to needs of the relevant member states requiring support in the area of planning the decommissioning of nuclear power plants and research reactors.**

10. CONCLUSIONS

- Participation of the Czech Republic in the IAEA activities is very useful.
- IAEA projects – a good forum for exchange of information.
- The Czech Republic shares the experience in the field of decommissioning of nuclear facilities.

11. ACKOWLEDGEMENT

- I would like to thank to the IAEA for the support and sponsoring my participation at the WM09 conference.

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Thank you for your attention

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